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POLYMORPHISM IN BACTERIAL DEVELOPMENT.

OF all the questions connected with that now extensive borderland of pathological science, bacteriology, there is not one which has given rise to more controversial discussion among systematic biologists, or afforded more room for doubtful conclusions by their confraternity, the pathologists properly so called, than that of polymorphism, or pleomorphism, in the life-history of the organisms under consideration.

Even yet, the ordinary works on biology, as written for the use of students, describe the several forms known as micrococci, bacteriæ, bacilli, spirilli, etc., as presenting characters which are, at least, as distinctive as those pertaining to an equal number of the natural orders of flowering plants taken at random.

When to these the familiar plantage of the bacteriological specialist, comes now to be added a category of *mycelial organisms*, practically indistinguishable from ordinary moulds, except, perhaps, by their minuteness, the apparent incongruity of expecting that any one of these groups of organisms should assume, even were it but for a short period, the typical morphological characters of another, is quite as great—borrowing a favourite phrase of another profession—as expecting to "gather figs of thistles."

And when, in addition, it is well understood among investigators how great is the necessary care required in keeping bacterial cultivations "pure," it is not to be wondered at that one should not only be ready to question the validity of a fellow-worker's results, when one form of organism is replaced by another, or appears alongside of it, but in similar circumstances, should even feel inclined to entertain doubts about his own.

Contamination with another organism would be set down as the cause of the anomaly, the more especially in all cases where the newcomer bore a *mycelial* character; for it requires

but little experience to find how readily one's material may become "mouldy" with the slightest relaxation of the usual precautions.

So deeply founded, indeed, has this conclusion been, that notwithstanding the work of Lister in 1873, Ewart in 1878, Cienkowski in the same year, and, more particularly, Zopf in 1881, all of whom have advocated the doctrine that micrococcus, bacterium, bacillus, etc., are only phases of the same life-history, bacteriologists of the purely pathological type have clung to the main idea of distinctive character among these groups of organisms, with a separate and, more or less, permanent life-history for each.

Zopf's classical arguments concerning the polymorphy or pleomorphy of micro-organisms appeared in his great work (*Zur Morphologie der Spaltpflauzen*) in 1882, although several investigators, among whom were Haberkorn and Miller, had previously expressed almost identical views.

Miller's observations were chiefly upon *Leptothrix buccalis* and other allied genera (*Archiv. fur Exp. Pathol. und Pharmak*, 1882). Kurth (*Berichte Deutsch Bot. Gesell, I.*, 1883) arrived at nearly identical conclusions by repeating several of Zopf's experiments.

Not to mention several other respectable authorities on the purely biological side who have expressed their views regarding pleomorphism among bacilli, I am not aware that any well-founded conclusions were reached by *pathological* bacteriologists previous to the facts established by Professor Williams in 1882 while investigating the cause of *Louping-ill.* These facts, at first so much discussed (and, may I venture to say, passed over by several as being heterodox, from the reasons just given), have received of late so much corroboration from the bacteriological study of other diseases, that for present purposes I require only to mention them—for an account of Professor Williams's results, the reader is referred to that author's work on veterinary medicine, notably the 1897 edition, or to the late issue of the "Transactions of the Highland and Agricultural Society."

The interest to me of Professor Williams's work on louping-ill has by force of circumstances been chiefly sustained from its peculiar biological importance. The question of the mode of inoculation by the sheep-tick, highly interesting in itself, as being the first scientifically explained case of disease transmission in that manner (although other diseases have of late been found to be transmitted in the same way), the measures to be adopted for prevention and cure, with

other matters of more or less practical importance in combating this affection, have naturally received less of my attention.

Indeed, I may say the very elements of doubt and apparent incongruity connected with the earlier stages of the louping-ill investigation served to stimulate me the more forcibly to examine for myself all the points of the case; for this, my opportunities have since 1882 been somewhat extensive in the field, the microscopical laboratory, and the photographic room. Of this, however, more anon.

Almost the entire object of the present article is to draw attention, in the first place, to the now well-established fact of *bacterial pleomorphism*, and, in the second place, to consider specially the intercident occurrence in some peculiar cases of *mycelial filaments* in the course of development of certain micro-organisms.

It was with these two objects mainly in view that I read in May last before the SCOTTISH MICROSCOPICAL SOCIETY, a paper bearing the title of the present article, of which paper, however, this is neither a transcript nor a condensed account; for circumstances lending interest to the subject having since transpired, and given further evidence corroborative of what appeared to be the most exceptional of my statements, I am now enabled to place several matters in a stronger light.*

Should the reader consult that paper he will find that even in the absence of these recent developments above alluded to, I expressed myself as perfectly convinced of the validity of the results arrived at by Professor Williams and myself. The close correspondence between specimens prepared at times and places widely distant, and by various methods of preparation, was of itself conclusive of the identity of the organism. In view of the criticism, which has certainly not been left unexpressed, that several if not all of the varieties of form presented, were accidental contaminations, this constant occurrence of the same forms under various hands and modes of treatment, and at widely separated localities would seem to indicate that "contamination" may at times affect criticism as well as modes of research.

Having thus set aside the contamination cause of diversity, it remains yet, however, to make certain whether the types under examination represent developmental stages in the life-history of one and the same organism, or indicate the presence of more than one individual type of germ.

* The paper referred to appears with illustrative photo-micrographs in the number of that Society's journal now in press.

The question of occasional multiplicity of organism in causing one disease, while unfavourably received by the majority of observers, has certainly been held as proved by some eminent men; and on this account while personally strongly convinced that the various forms were sequential, I was not prepared to deny that there might be more than one organism in the case; these organisms appearing, however, constantly together in the same disease, and not making their entrance now and again as contaminations. I believe Professor Williams has expressed himself similarly, but to him this matter is of secondary importance, as it has been his great object to show that certain well-marked organisms were present in louping-ill, and that these could be observed in a complete series in the fluids of the sheep-tick and cultivations from them, and further, that inoculation with these cultivations produced all the symptoms of louping-ill in the sheep, and gave microscopical appearances corresponding with those seen in animals that had acquired the disease in the usual way, viz., by tick-bite in the field.

As already stated, however, the matter has all along been of great biological interest to me, and every repetition of the experiments served only to cause me more and more to adhere to the view that *all* the forms of organism seen in the cultivations were but stages of development in the one life-history. I heartily confess that for some time, at first, the *mycelial filaments* which came up over and over again in the cultivations, somewhat staggered me, for the occurrence of anything so definitely filamentous as these were, in any bacterial cultivation whatever, was a thing then unheard of. Little wonder, then, that anyone not too anxious to accept the results, should suggest the entrance of *mould* into the material. Indeed, one eminent microscopist asserted, as I have been told, that the fine branching threads were *capillaries!*

Since these early days matters have, however, changed, and beyond the authorities quoted as favouring a general pleomorphism among bacilli, evidence has slowly been coming in, of distinctly filamentous stages occurring in the development of several bacilli. Buchner and others have of late recorded many such observations.

In the "Bulletin of the Johns Hopkins Hospital," which appeared last June, is to be seen a good photogram, accompanied by lucid description of just such an apparently anomalous mycelial filament as the louping-ill cultivations

have shown, the difference being mostly noticeable in the greater tendency of the latter to branch, and in the tendency to form clubbed ends being much less marked, although occasionally seen. Both agree in presenting apparently structureless unsegmenting threads at the beginning of their growth, not to be confounded with the previously well-known "spore-filament" stage developed in the life-history of most bacilli; in the words of the author, "they are of a true mycelial type." Unfortunately, publishing facilities do not permit me to reproduce side by side the photograms of Professor Williams' organism, and of the above-mentioned filamentous anomaly, but the critical reader can have no difficulty in comparing the photograms from the sources named.

The second corroborative source of description and photomicrographic illustration is still better suited for comparison with the results I have been able to figure, not only on account of the great similarity of descriptive character of the filaments, but also by reason of the numerous excellent photograms by which the paper is illustrated. I refer to a paper now published in the *Journal of Pathology and Bacteriology*, for June, 1897, as an epitome of the "Jacksonian Prize Essay on Tetanus for 1895," by the joint authors—Professor Kanthack, Cambridge University, and Professor Connell, Queen's College, Kingston, Canada. The title is, "On the flagella of the tetanus bacillus, and other contributions to the morphology of the tetanus bacillus."

The first portion of that paper deals with the demonstration of numerous flagella in certain stages of the tetanus bacillus, preferably by Ermengem's method (silver nitrate, with reduction by gallic acid, thus "silvering" the flagella), but Pitfield's staining method is also given (alum, gentian, violet, alcohol, and tannin being the re-agents used).

Space prevents further reference to that part of the paper, the more so that it is in the second part that matters so intimately connected with the present article are to be found. The second part treats of the *branched and mycelial forms* which revealed themselves during some of the cultivation experiments, "reminding them," as the authors say, "of the clubbed, branched, and apparently mycelial forms of the bacillus of human tuberculosis and the bacillus of diphtheria, as described by Klein, &c., only presenting characters more truly mycelial, and more extensively branched than previously noticed in the life-history of any known bacillus." (They must not have been acquainted with the bacillus of louping-ill.)

As in the latter bacillus, the filamentous stage of the tetanus bacillus, which at first is without visible segmentation, gradually begins to show transverse divisions. In Professor Williams' work, these segmental units are called "bacteriod," from the difficulty felt at first of reconciling their appearance with what was previously known about the development of similar organisms. The authors just quoted seem also to have had a difficulty in placing these segments in their true genetic position, for they say:—

"The filaments are made up" (at this stage) "of individual bacilli, which at first sight do not quite resemble tetanus bacilli, and *we were extremely suspicious, and expected that there was some form of contamination.*"

The "drumstick" form of bacillus, which is indicative of the tetanus bacillus, was not found among these segmented filaments. The broth cultivation in which were found these peculiar mycelial filaments, leading up to individual bacilli of a type differing from the true "drumstick," was made from peritoneal exudation of an animal (guinea-pig), which had died after inoculation with tetanus bacilli scraped from the surface of agar-agar.

"Sub-cultures from this broth cultivation were next made, which almost immediately lost the mycelial type, and developed into ordinary bacilli, with numerous 'drumsticks,' and which, when inoculated into a guinea-pig, produced typical tetanus, while in the mycelial form the organisms led to no lesion in the animal." The whole of this latter statement agrees precisely with the cultivation and inoculation results attained by Professor Williams in his louping-ill investigations.

When it is considered that many of the symptoms of louping-ill simulate somewhat a slow and aberrant form of tetanus, and that, therefore, the organisms of these two diseases may belong to the same family, as a systematiser might say, it is to be expected that peculiarities of development seen in the one should also, in some degree, be noticeable in the other.

The authors just quoted speak much of this so-called *mycelial type*, and seem to think "that these clubbed and mycelial types indicate either a progressive or a retrogressive metamorphosis to a mycelial form." It may be of interest to note that in the case of the guinea-pigs which died from tetanus, "the peritoneal exudation gave growths which at first contained nothing besides these clubbed and mycelial forms."

Now, this is exactly the case in louping-ill, in which disease the spinal exudation shows only the filamentous stage of the organism. The results from sub-cultures are also parallel in these two diseases. It is also curious to observe the anxiety of the authors of these observations on tetanus to convince the reader of what they are thoroughly convinced themselves, viz., the impossibility of accounting for these peculiar appearances by contamination. They give as arguments the usual facts which are supposed to satisfy the bacteriological specialist, but in finishing up, rather detract from the degree of conviction their arguments may have produced, by saying, "we regret that, so far, we have not been able to obtain identical results on repeating the course of experiments. More hopeful results are hoped for."

Identical results, corresponding in every detail, are scarcely to be looked for where so little is known concerning the conditions which favour these peculiarities in development, and, if I remember correctly, the specimens of louping-ill material which I examined with Professor Williams in 1882 showed more of the "clubbed" forms than I have since had the opportunity of seeing. Indeed, it is in this one point alone that the drawings I then made differ somewhat from the recent photo-micrographs of the same organism. It goes, however, without saying that the total correspondence in microscopic appearance, in cultivation peculiarities of growth, in inoculation effects, as well as in source of contagion, affords evidence enough that the same forms have been under examination all the time.

The aforementioned want of comparison between the photographic illustrations of the two diseases referred to makes it impossible for me to direct attention to many points of interest, but should the reader be inclined to prosecute the subject further, he will find in plates xxxv., figs. 10, 11, and 12, and in plate xxxvi., fig. 18 of the *Journal of Path. and Bact.*, June, 1897, appearances which resemble very closely indeed figs. 35C, 35D, 35E, 35H, and 35K of Professor Williams's "Veterinary Medicine, 1897."

After giving due consideration to the main facts forming the text of this short article, one can scarcely fail to see that as yet we have not reached that point of assurance in regard to bacterial morphology which the writers of some text-books and of a variety of magazine criticisms have long treated as cut and dried.

Human knowledge, like most mundane affairs is wave-like in its motion—it advances only by repeatedly standing still and swinging backwards.

No sooner was the "spontaneous generation" theory burst up, then it came to be fashionable to adopt a sort of cast-iron belief in the fixity of individual forms, at least when under similar conditions and through a period of time coming within practical limitation.

Now, the more sensible of our theorists have come to consider that after all, LIFE is as yet so far beyond our means of thorough scientific investigation, that it would be hard indeed to say without a guess whether uniformity of "environment" is absolutely necessary for permanence of form, or the converse; whether diversity of living expression, morphologically or otherwise, may not be possible even under permanently invariable conditions, so far as we can judge of "invariable conditions" by the means at our command. Like the gentleman who had occasion to visit Newgate, we fail to take in the congruity of the surroundings, because we happen to be located on the wrong side of the door.

The most recent modes of investigating vital problems seem to promise better results than have been gained hitherto: attention to the chemical and physiological conditions which are observable, is likely to lead to a closer approach to the *great problem* than a mere examination of morphological embodiments could ever have done.

No doubt this gives less scope to the systematist, but hang "system"—the irregular regularity of Nature is not systematic. Practically, the difficulty in cases like that affording matter for this article is in tracking up processes or forms which defy system, by a process which to claim scientific method at all must be systematic. This is no quibble. In bacteriology, however, as in all new sciences, one is extremely liable to be led into lines of procedure which seem well founded and hard and fast (the only hard and fast things about the science, in fact), while all the time any little real advance that is made seems to be only when some fundamental rule is broken.

After all, it would appear that bacteriologists have much to learn before they can stand up for their genera and species, etc., etc., with anything like the certainty shown by their big brothers, the botanists and the zoologists. Fortunately for the science of medicine this is not required, although the biologist may strain after the achievement.

As one of the conclusions to be drawn from these recent views of bacterial polymorphism there is, perhaps, first, the one most prominent, by reason of its decidedly unsettling tendency—the idea that microscopic character may, in many

cases, be no true criterion of the organism under examination.

No doubt this is partly true.

On the other hand, when the conditions which assist in causing these anomalous developments come to be better known, and when it is made out that, even with some of the most deadly organisms, many of these peculiar forms are innocuous, the means will not be far out of reach for bringing down at will a host of baleful bacilli to the condition of so much "clean dirt."

Of course, absolute killing were the preferable consummation, but alas, we all know how the total destruction of pathogenic organisms in a living animal is likely to do the same by their unfortunate host.

It may also be assumed that the very lines on which the attenuation of contagious material for the purposes of inoculation are prosecuted embrace many conditions depending, more or less, upon pleomorphism, or, to express it, perhaps, more correctly, conditions are produced of which the change of shape, slight though it may be, is but the outward indication of more profound internal changes.

Even with the higher organisms, we know extremely little about the connection between food and tissue changes; with the lower organisms, next to nothing. The fortunate point, however, is this, that imperfect as our knowledge is about the apparently simple, though intensely involved, processes which are noticeable during the life-history of the whole group with which the bacteriologist deals, that little knowledge has, perhaps, done more for suffering flesh than all the combined sciences of the schools.

JAMES HUNTER, F.R.C.S.

WILLIAMS v. ROYAL COLLEGE OF VETERINARY SURGEONS.

Ladies as Veterinary Surgeons.

LORD KINCAIRNEY, in the Court of Session, Edinburgh, heard Counsel in this case on the 22nd October, 1897.

The Pursuers, who are Principal Williams and his son, W. Owen Williams, proprietors of the New Veterinary College, Edinburgh, and Fellows and Members of Council of the Royal College of Veterinary Surgeons, were represented by Mr. Wm. Campbell, Advocate, and Dr. Daniell, Advocate, instructed by Mr. Thomas M. Horsburgh, S.S.C., Edinburgh, and the defenders, the Royal College of Veterinary Surgeons, were

represented by Mr. Thomas Shaw, Q.C., M.P., and Mr. Abel, Advocates, instructed by Messrs. Wishart and Sanderson, W. S., Edinburgh. Mr. Abel opened the case on behalf of the defenders, and he stated that the Pursuers sought to have it found and declared, by decree of the Lords of Council and Session, that the defenders are bound to admit to the examinations held by them in Scotland in terms of "The Veterinary Surgeons Act, 1881," and particularly section 4 thereof, all students, whether male or female, attending the said New Veterinary College, Edinburgh, who are of the prescribed age and hold the prescribed certificates, and otherwise comply with the regulations and bye-laws relative to said examinations, and that the defenders are not entitled or otherwise and alternatively are not bound to exclude any such student from said examinations merely upon the ground that such student is of the female sex, and that the defenders are bound or otherwise and alternatively are entitled to admit and register such students, whether male or female, as have passed said examinations as members of the said Royal College of Veterinary Surgeons under the provisions of the said charters and Act of Parliament: and that the defenders ought and should be decerned and ordained, by said decree, to admit to the said examinations held by them in Scotland, all students, whether male or female attending the said New Veterinary College, Edinburgh, who are of the prescribed age, and hold the prescribed certificates, and otherwise comply with the regulations and bye-laws relative to said examinations: and that the defenders ought and should be interdicted, prohibited, and discharged by said decree, from excluding from the said examinations any student, whether male or female, attending the said New Veterinary College, Edinburgh, who is of the prescribed age and holds the prescribed certificates, and otherwise complies with the regulations and bye-laws relative to said examinations; and whether decree be pronounced in terms of the foregoing conclusions or any of them, or not, the defenders ought and should be decerned and ordained, by said decree, to make payment to the pursuers of the sum of £50 sterling.

Mr. Abel then went on to argue that the Scottish Courts had no jurisdiction in the matter, as the Royal College of Veterinary Surgeons had its office in London, and did not, in his view, carry on business in Scotland. He stated that the pursuers averred that the concerns, affairs and property of the said Royal College were managed partly at 10, Red Lion Square, London, W.C., and partly at 8, Grove Street, Edinburgh, and

that their annual general meeting was or might be held in Edinburgh. The defenders denied that their affairs and property are managed partly at Edinburgh. He explained that the affairs and property were managed by their Council in London, and that the Board of Examiners had a resident secretary in Edinburgh to aid in arranging for and carrying through the periodical examination of candidates in Scotland and he stated that Mr. Rutherford, the said resident secretary, had no control over the funds. In the second place, he argued that although the pursuers had arrested funds belonging to the defenders in Scotland, this was not a kind of action in which jurisdiction could be founded by arrestment because it was an action of declarator involving a question of *status*, and, although the pursuers concluded for a certain sum of damages, he stated that this was merely ancillary to the declaratory conclusions and did not alter the nature of the action. He quoted some prior cases in support of this contention.

On the question of the pursuers' title to sue the action, Mr. Abel argued that the Royal College had no direct connection with the teaching colleges, nor had they (the teaching colleges) any control or management of the examinations of the Royal College. He described the system of examination in Scotland, and stated that there was nothing in the defenders' bye-laws as to sex, and he argued from the Charter of 1844 and the supplementary charters that these did not alter the principle that the defenders' College had the right to regulate who should come up for examination. He also read the pursuers' Royal Sign Manual affiliating the New Veterinary College to the R.C.V.S., and argued that the pursuers were not thereby entitled to force the defenders to grant diplomas. In concluding, he submitted that (first), there was no jurisdiction, as the defenders might be said to be a company domiciled in England. Lord Kincairney: "You do not aver on the Record that their domicile is exclusively English." Mr. Abel then argued that the arrestment to found jurisdiction was an admission by the pursuers that the defenders were domiciled in England. Lord Kincairney pointed out that the arrestment was only alternative, and that the pursuers were entitled to maintain either ground of jurisdiction. Some discussion then took place as to the defenders putting in an amendment as to domicile; and (second), there was no title to sue. Lord Kincairney stated that the pursuers sued in two capacities—first, as proprietors of the New Veterinary College; and, secondly, as Fellows and Members of the Council of the Royal College of Veterinary

Surgeons to have it restrained from acting *ultra vires* in excluding the said lady. Mr. Abel argued that one of a body of trustees would not be entitled to bring an action to have the majority restrained from acting *ultra vires.*

Dr. Daniell followed for the pursuers, and stated that his friend had increased considerably what was to be said in the case by laying so much stress on the question of jurisdiction. The real point was, were the defenders bound to admit a lady sent up from the pursuers' college, having all the qualifications which in a male student would have been sufficient to entitle the applicant to be received for examination? The question, he said, had arisen in Scotland in a Scotch college, and in connection with the examinations held by the defenders in Scotland. The lady's certificates had been sent in the usual course to Mr. Rutherford, and he had sent them on to London, and they had been returned to her through Mr. Rutherford. The refusal to receive her for examination, was intimated to her by letter from the London solicitor of the R.C.V.S. He argued that the R.C.V.S. was entrusted by its Charter with the right and duty of examining students coming up from all parts of the United Kingdom and Ireland, and it was bound to make provision for examining students in Scotland twice a year, and the said refusal was a wrong committed or threatened to be committed in Scotland, and the Scotch Courts had therefore not only jurisdiction in the matter, but they were the only courts that could enforce its judgment in Scotland. The Act of Parliament and Charters referred to in the record, imposed restrictions and regulations upon the Scottish people, and he argued that it would require some very special enactment to force them to go to London or elsewhere for the remedy in the event of the defenders misconstruing their powers. He stated that there were two secretaries to the Board of Examiners, one for Scotland and one for England, and both held their appointments alike from the Council of the R.C.V.S., and it was surprising to note that the defenders had the sole right of examining for qualification students in all parts of the United Kingdom, and that there were three colleges in Scotland preparing such students, and only one in England. A great deal of business was necessarily done in Scotland by the defenders in connection with their examinations here, and they had been properly cited. When a student passed his final examination, he signed the register of the Veterinary Surgeons at the place where he was examined, and where he received his diploma, this register being sent

to Edinburgh or Glasgow, as the case might be, when the examinations were being held.

On the question of title to sue, he argued that the pursuers' rights under the Sign Manual as proprietors of the New Veterinary College were being invaded by the defenders, and that they were entitled to appeal to the court for their remedy. The duty of the R.C.V.S. to the pursuers' college was a statutory one, and if they failed to fulfil it the pursuers were entitled to come to the courts and ask that they should be ordained to do so. The pursuers had a further title as Fellows and Members of the Council of the Royal College to have the defenders restrained from doing anything *ultra vires*, and he quoted legal authority in support of this contention, and cited a case where a single preference shareholder in a railway company had been held to have a title to sue an action to restrain the company from running steamboats on the ground that it was beyond their powers.

Mr. Thomas Shaw, for the defenders, argued that the conclusion for damages was ancillary to the declarator, and that no pecuniary right of the pursuers had been invaded, and should the declarator fail, he thought, the claim of damages would also fail. The effect of the decree of the court here would be to settle the right of students to practise in all parts of the kingdom, and he contended that nothing in the Charters conferred upon the courts of Scotland any such power. He quoted from the 1844 Royal Charter:—

> Do by these presents for Us, our heirs and successors, will, grant, ordain and declare that the said Thomas Turner, William Joseph Goodwin, Thomas Mayer, William Dick, William Sewell, Charles Spooner and James Beart Simonds, together with such others of our loving subjects as now hold certificates of qualification to practise as veterinary surgeons, granted by the Royal Veterinary College of London, or by the Veterinary College of Edinburgh, respectively, and such other persons as respectively now are and may hereafter become students of the Royal Veterinary College of London, or of the Veterinary College of Edinburgh, or of such other Veterinary College, corporate or unincorporate, as now is or hereafter shall be established for the purposes of education in veterinary surgery, whether in London or elsewhere in our United Kingdom, and which We or our Royal successors shall, under Our or Their sign manual, authorise in that behalf, and shall pass such examination as may be required by the orders, rules and bye-laws which shall be framed and confirmed pursuant to these presents, shall, by virtue of these presents be members of and form one body politic and corporate by the name of "The Royal College of Veterinary Surgeons," by which name they shall have perpetual succession and a common seal, with full power and authority to alter, vary, break and renew the same at their discretion, and by the same name to sue and be sued, implead and be impleaded, and answer and be answered unto in every court of Ours, Our heirs and successors.

and he argued that this did not extend the bounds of juris-

diction of any court, and that it implied that the court must otherwise be competent and that it did not comprehend the right of the pursuers to bring the defenders from another part of the kingdon. He stated that the Register that was signed by the entrants, which was before referred to, was not the real register but the Register was the alphabetical list of members commencing at page 121 of the "Register of Veterinary Surgeons, 1897." On a general view of the case he said (first) that the defenders had heritable estate in England, (second) the entire staff was in London, (third) Mr. Rutherford was merely "a hand on the spot," or "a local secretary or agent," (fourth) that the Council held its meetings in London, (fifth) that the Scottish secretary sends a note of the names of the students coming up for the several examinations to the London secretary. (Mr. Daniell objected to this last statement and stated that it was only the names applicable to the first examination that were sent up.) Mr. Shaw therefore argued that a degree in England in this action would be operative in Scotland, that if there were no ordinary means of enforcing it, the courts here would concur in it so as to make it operative. Lord Kincairney, "It does not follow that the same decree would be pronounced in Scotland." Mr. Shaw argued that if different interpretations were put on the Act and charters in different parts of the United Kingdom, it would lead to a good deal of confusion, and he stated that every person must have a domicile, and he presumed the same about a corporation, and that the domicile of this corporation was in England.

Mr. Wm. Campbell stated at the outset that the defenders did not aver on record that their sole domicile was English, and that while he addressed himself to the argument, he presumed that before a judgment was given, the defenders would tender some amendment to their Record. He stated that here was a charter incorporating the Royal College for the unification and regulation of a profession throughout the whole of the United Kingdom and Ireland, and he submitted that it would require a very strong case to show that the common Sovereign had deprived all Scotsmen of their undoubted right to appeal to the laws of their own country and force them to go to London to seek a remedy against a Corporation which was exercising most important rights, privileges, and duties throughout the whole of Scotland. He argued that Scotch courts were the only competent courts in this matter, and that a decree obtained in London could not be enforced in Scotland, or if at all, in a very

indirect way. He stated that the Act of 1881 created a monopoly in favour of the members of the Royal College of Veterinary Surgeons against any person holding himself out as a veterinary surgeon or a practitioner of veterinary surgery unless he held the qualification stated in the Act. This was, no doubt, a beneficial monopoly, both for the profession and the public at large, and it is not to be supposed that, by implication, in such an Act the Scottish people are to be deprived of their right of appealing to their own courts in any question arising under the said statute, and he pointed to the special statutory duties in section 4 of the said Act, whereby the Royal College are *bound* to make provision for the examination in Scotland of the students attending the several veterinary colleges. On the question of jurisdiction by the arrestment, he maintained that the conclusion for damages was a substantive conclusion by itself, and that the court were entitled and bound to decide any questions arising in connection with the claim of damages, and that in this case, he submitted, the court would have to determine whether or not the defenders had acted *ultra vires* in excluding the said lady from examination. On the title to sue, he argued that the pursuer's rights, under their sign manual or letters patent, had been invaded by the defenders, and that, undoubtedly, they were entitled to appeal to the court in the matter, and that their position as Fellows and Members of the Council of the Royal College entitled them to restrain the Council from acting *ultra vires*.

Some conversation then took place between Lord Kincairney and counsel as to defining the duties of the defenders in Scotland, and as to how they exercised them, after which his Lordship made avizandum.

ANATOMICAL IRREGULARITIES.

BY O. CHARNOCK BRADLEY.

It has always appeared to me to be a matter of regret that no systematic record is published by veterinary anatomists of deviations from the normal which are met with from time to time in the dissections performed, as a matter of daily routine, in our various institutions. That such variations exist there can be no possible doubt, and that they exist more frequently than is at present suspected would, I think, be proved if a look-out were kept for them and notes made on the spot. Any irregularity, however slight, is always of

interest to the teacher and investigator, though it may have no surgical importance; but some irregularities are of interest not only to the anatomist, but also to the surgeon, as they may cause a considerable amount of confusion to the latter if unexpectedly encountered in the course of an operation. Some few months ago I reported such an abnormality, viz., the splitting of the median nerve, and received ample return for the slight trouble of recording the case in the shape of appreciation of its importance by a surgeon who regularly performs median neurectomy. This instance also illustrates the possibility of an irregularity of no surgical importance to-day becoming of moment at some future date; for before the days of median neurectomy no surgeon would have troubled himself for a moment concerning the liability of a splitting of the nerve. For this reason, therefore, if for no other, would it not be well for teachers of veterinary anatomy to note and periodically record any instances of irregularity they may deem worthy of such honour? Such thoughts have led me to jot down some of the more pronounced variations disclosed in the course of the ordinary work of the Practical Anatomy class in the New Veterinary College, Edinburgh, during the session 1896-97. Should any of the following notes appear somewhat trifling, I can only plead that they did not so appear to me at the time they were made.

Omo-hyoideus muscle. — The omo-hyoideus (subscapulo-hyoideus) muscle on the right side of the body was joined by a bundle of muscular fibres which took origin from the fascia covering the Longus colli muscle. This band was thin, and about half-inch broad, its length being four inches. There was no continuity between these fibres and the fibres of the Longus colli. The band passed backwards from the point of origin indicated above.

Trachelo-mastoideus muscle.—The Trachelo-mastoid (small complexus of Chauveau) muscle on the left side of the body presented no trace of origin from the first and second Dorsal transverse processes; the cervical attachment was normal, as was also the entire muscle on the other side of the body.

Interosseous Metatarsal muscles.—In both hind limbs of one subject we were enabled to detect *three* interosseous metatarsal muscles. The extra muscle arose from the upper part of the external border of the superior sesamoidean ligament; it was much smaller than the two usual muscles, and its tendon blended with the fascia above the fetlock. Of the significance of this muscular bundle I shall only surmise that

it was possibly a hyper-development of the ordinary muscular tissue of the ligament; it struck me as being noteworthy, seeing that it was developed equally in both limbs. I have never seen a similar occurrence.

Nerve to the Biceps (*Flexor Brachii*).—It seems to be frequently the case, that this nerve passes between the coraco-brachialis and the humerus *above* the upper insertion of the muscle instead of between its two insertions; and where this happens in one limb, it is almost always the same on the opposite side of the body.

Papillary muscle of the Heart.—The anterior papillary muscle in the right ventricle resembled two muscles fused together at their apices; or perhaps it would be better to say that it sprang from the ventricular wall by two distinct roots.

Occipital and Internal Carotid Arteries.—We have observed these two arteries arising from a common trunk; in this case the carotid appeared to bifurcate, the result being the external carotid and the common trunk.

Glosso-facial Artery.—The Glosso-facial (submaxillary, facial) artery gave off a large branch which passed upwards over the inferior border of the ramus of the lower jaw, midway between the insertion of the sylo-maxillaris, and the anterior border of the masseter. It immediately sank into the substance of the masseter and was traceable upwards in a vertical direction as far as the zygomatic ridge. Anastomoses were established with the maxillo-muscular and transverse facial arteries.

Long Saphenous Vein.—This vein, instead of insinuating itself between the gracilis and sartorius muscles and terminating in the femoral vein, wound round the posterior border of the gracilis and joined a radicle of the obturator vein.

LECTURE ON "CHEMISTRY AND ITS RELATION TO VETERINARY SCIENCE."

DELIVERED BY PROFESSOR GOODWIN AT GLASGOW, OCTOBER 20, 1897.

PRINCIPAL MCCALL read out the list of gentlemen who, during the past session, had been awarded prizes, and these were afterwards distributed.

The following gentlemen were present, also the students attending the College:—John Ferguson, Esq., M.A., LL.D., F.S.A., in the chair; Professor W. O. Williams, Edinburgh; Messrs. Brownlie, M.R.C.V.S., Coatbridge; Blue, M.R.C.V.S., Glasgow; Begg, M.R.C.V.S., East Kilbride; D. Hamilton,

M.R.C.V.S., Hamilton; T. Hamilton, M.R.C.V.S., Glasgow Corporation; Houston, M.R.C.V.S., Stirling; Douglas, M.R.C.V.S., Kilmarnock; Macfarlane, M.R.C.V.S., Greenock; Peddie, M.R.C.V.S., Cathcart; Constable, M.R.C.V.S., Inchture; Brown, M.R.C.V.S., F.H.A.S., Hamilton; McNeil, M.R.C.V.S., Greenock; Rev. Mr. Scott, Bargeddie; Brand, Baillieston; Rev. D. Watson, Glasgow; Principal McCall, Glasgow Veterinary College; James McIntosh McCall, M.B., C.M., M.R.C.V.S., Glasgow Veterinary College; Professor Limont, M.A., M.B., Glasgow Veterinary College; Dr. Cameron, M.B., C.M., D.P H., Glasgow Veterinary College; Professor Goodwin, F.C.S., Glasgow Veterinary College; Professor Elliot, M.A., B.Sc.F.L.S., Glasgow Veterinary College; Professor Murphy, F.Z.S., Glasgow Veterinary College; John R. McCall, M.R.C.V.S.. Glasgow Veterinary College.

Mr. Chairman and Gentlemen,—I am pleased to have the honour of addressing such a large and representative gathering of those interested in veterinary science.

It is customary to offer a few words of advice to those students who, having finished their college career, are about to begin the serious struggle for existence, armed with the initials M.R.C.V.S. To you I would say: Be honourable in all things, and bear in mind that whatever you do will be not only either to your own credit or discredit, but also to the honour or dishonour of the Royal College of Veterinary Surgeons. Devote yourselves to your profession; by work, and hard work, you have been successful so far; by work, and hard work only, will you be prosperous in the future. To those of you who are to continue, and to those of you who are about to begin your studies, I would, in the first place, offer my sympathy, but at the same time warn you that you will attain to such honours as these, and your M.R.C.V.S. only by careful and constant attention to the subjects brought before you at the lectures and demonstrations. You will find the work of the first year laborious, but I have no fear of any one of you who makes up his mind to earn his nightly rest and sleep by daily conscientious study, always keeping before you the quotation: "*Mens sana in corpore sano.*"

Before coming to my remarks proper, I wish respectfully to suggest, in the hope that it may reach the ears of the Board of Examiners, that a similar course be adopted with regard to anatomy as is now in force in the medical curriculum, namely, to have only one examination on that subject, and this at the end of the second year of study. It may be argued

that the students knowing they were not to be examined in osteology would neglect it; personally, I have not the slightest fear of any veterinary student neglecting such an interesting and important part of his studies as osteology; in fact, knowing they were not to be examined immediately upon it, they would like it, and liking it, they would learn it. Such a change would lighten the work of the first year which I consider much too heavy for any student, and more especially so when we consider the papers set in chemistry during the past few years. One other point. The professors in the four Veterinary Colleges are not permitted to take part in examining the students taught by them; this I consider an injustice, both to teachers and taught, and hope to see this remedied soon, believing the change would prove beneficial to all concerned.

Chemistry is a very comprehensive subject, since it deals with the ultimate particles which constitute all the various forms of solid, liquid, and gaseous matter with which we are acquainted through our several senses. Everything in the animal, and vegetable, and mineral kingdoms is composed of one or more of some 70 substances, which we call "elements," because their particles are all alike, or identical, and hitherto have resisted every attempt to prove them compound. In the chemical class-room we place before the student the most important of these elements, and demonstrate their distinguishing properties. We show the student that these elements unite, in certain definite proportions, to form what are called compounds. We try to experimentally prove that there are evidently some well-defined "laws" regulating the formation of these compounds. Proceeding, we draw the student's attention particularly to the nature of the compounds he is likely to make use of in his future work; and finally we attempt to give him some useful information regarding the chemical nature of so-called organic substances, *i.e.*, substances met with in living things, animal and vegetable. Briefly permit me now to choose one or two points in the several subjects of the veterinary course, and to endeavour to show you their dependence upon a knowledge of chemical principles. Biology, restricted to the elementary principles of Zoology and Botany, forms a part of the veterinary curriculum. Zoology gives the student some notion of the various forms of life met with in the animal kingdom, from the Protozoa, or first animals, to the Vertebrata, which includes all our domestic animals, but excludes our parasitic acquaintances. Botany lays before the student the many wonders of the vegetable kingdom which provides the animals with their

food-stuffs and medicines. The zoologist will tell you that protoplasm is the substance through which all the phenomena of vitality manifest themselves, that it is a jelly-like material, more or less granular in appearance when seen under the microscope, and that it is composed of carbon, hydrogen, oxygen, nitrogen, with sulphur, and, it may be, phosphorus. It would, indeed, be a waste of time to enumerate the elementary constituents of protoplasm, did you not at the same time give the student some definite chemical information with regard to the individual properties of these elementary constituents.

Plants live upon so-called inorganic materials derived partly from the air, and partly from the soil; from these comparatively simple substances the plant elaborates the various complex bodies which form its several parts. Many links are still wanting in the chain of facts indicating the chemical changes which take place during that elaboration, still on not a few of these points there is little or no doubt, in the chemist's mind at least, of the chemical nature of the changes, *e.g.*, take the all important subject of assimilation; here the green coloured cells of the leaves take in carbonic acid gas, and with the aid of the carbon it contains, and the altered substances brought from the soil they form carbohydrate substances, which are either used in building up new tissues or are stored away in some portion of the plant for future use. Assimilation, in fact, is a vital process incapable of being fully explained or understood by anyone ignorant of the general principles of chemistry. Zoology and Botany are admittedly of value to the veterinary student but surely they would be worthless unsupported by a sound knowledge of these chemical principles. Coming to the subject of Physiology we find that it, too, leans for support upon this much-abused and neglected subject. Take the whole process of digestion of food, and what do we find it but a series of chemical changes from beginning to end, destined to convert the insoluble food materials into soluble substances capable of assimilation. In the mouth we have a small portion of the insoluble starch converted or hydrolised into soluble sugars through the agency of a ferment called ptyalin. The gastric juice secreted by the glands of the stomach contains a percentage of hydrochloric acid and the ferment pepsin: the acid removes the connective tissue or cellular coating of the fatty substances in the foods and thus prepares them for the bile, while the pepsin converts the proteid substances in the food into soluble peptones, capable of being absorbed into the body

proper. The chief function of the bile, secreted by the liver, is the conversion of the fats into soaps which are then taken up by the lacteals in the bowels and carried to the circulatory apparatus. These so-called digestive changes are, you see, strictly speaking, chemical reactions or transformations. Again, materia medica and therapeutics point out to us the nature and action of the many drugs used in the treatment of the various diseases. The action of the mineral substances used as medicines is largely dependent upon their chemical properties, and in the case of the more important vegetable materia medica each of them contains one or more chemical substances called the active principles; many of them are more or less basic in character, and in all probability their medicinal effects are due to this basic property. In connection with the treatment of disease, an examination of the urine is frequently of great help in arriving at the nature of the disease, but how many veterinary surgeons are there whose examination of the urine could be counted upon as having any weight in the diagnosis? for the simple reason that they, as students, have not considered it worth their while to make themselves thoroughly acquainted with the methods of examining chemically a sample of urine for albumen, sugar, etc.

Pathology, or Morbid Anatomy, or the study of the animal body in disease, is nothing more or less than the ascertaining of the changes brought about by the agency producing the disease; of course, the most evident changes are physical, macroscopic or microscopic, but the pathologist of to-day does not rest contented unless he can satisfy himself as to the nature of the chemical changes involved in the alteration of the tissues; in fact, in many cases he places the tissues in contact with some chemical re-agents and notes whether the alteration in colour, or other indication, is the same as, or different from, the normal tissue change. Again, in the treatment of many surgical diseases, various antiseptic agents are used to protect the injured parts from septic poisoning; these agents are well-known chemical products, whose properties are but imperfectly understood by practitioners, otherwise we would see better results in the treatment of surgical cases.

Lately, the subject of bacteriology has been added to the veterinary course. The word bacteriology means a discourse on bacteria or micro-organisms, organisms which belong to the lowest forms of vegetable life, and not to the animal kingdom as is popularly believed. Many of them find a suitable

habitat within some part of the animal body; there they discover suitable food, there they live and multiply, and in doing so they throw off certain excretory products. It is somewhat difficult for anyone who has not made a special study of bacteriology to understand the life of the microbe; this may help some of you to follow me: you have all seen the substance called yeast; this comparatively large vegetable organism lives well in a solution of glucose, grows in it, reproduces itself usually by budding, and throws off as excretory products; carbonic acid gas and alcohol. Carbonic acid gas is not a poison, but alcohol, except in medicinal doses, is a narcotic poison. It is very much the same thing with the so-called microbe. Finding within the animal a suitable medium not sufficiently strong to resist its attack, it feeds upon the tissues or glands, and like the yeast plant with all other living substances, gives off certain excretory products, these vary according to the nature of the organism involved, but in most cases they are highly organised chemical substances, usually of a basic character, and possessed of very virulent toxic or poisoning properties. It is in fact these toxic products, which, by their active chemical effects upon the fluids of the body produce the various diseases. Only by a careful and continued study of the chemical nature of the various fluids of the animal body, and by a careful study of the chemical effects of these basic poisons upon the fluids, will we ever be able to combat with any degree of success the many diseases affecting ourselves and the animals we have about us. The organism called the "tubercle bacillus" if it gets into the body of an animal whose fluids or tissues have been weakened by over-work or under-feed or whose tissues are pre-disposed to its action, finds a suitable home, makes use of these debilitated fluids or tissues as food, and throws off the toxic substance which has been isolated and named by Koch "Tuberculin." It is the tuberculin which plays havoc with the animal, by its chemical effects upon the fluids of the body. This tuberculin is an albumose substance capable of oxidation if it comes into contact with any oxidizing agent. In the blood we have a substance called oxyhæmoglobin, the body in fact which carries oxygen to the tissues. I am of the opinion that the tuberculin in the blood steals the oxygen from this body, and is thereby converted into less complex and less active substances. The blood deprived of its necessary oxygen is thus incapacitated from fulfilling its functions towards the tissues of the body; these tissues being deprived of this all-

important oxygen become weakened, and are less able to resist the attacks of the ubiquitous microbe which continues to give off fresh toxic substances, and the body, if it be unable to overpower this duplicate action, succumbs, and the animal dies of tuberculosis. Chemical action is invariably accompanied by a change of temperature, and the above-suggested chemical changes should account for the well-known elevated temperatures in cases of tuberculosis and other diseases caused by the action of the micro-organisms. Does this not render the mysterious action of the microbe tuberculi, etc., much easier of understanding to the ordinary mind? If it does, then I think the credit is due as much to the chemist as to the pathologist or bacteriologist. Further, it seems to me we have here an explanation of the fact that animals affected with tuberculosis in its earlier stages improve if they be placed under hygienic circumstances, that is, supplied with plenty of oxygen.

Publicly, we are beginning to provide ourselves and our domestic animals with more cubic space than formerly; this is commendable in the highest degree, because, in so doing we are providing a more plentiful supply of pure air and sunlight. The pure air supplies us and our domestic animals with the necessary oxygen to carry on the healthy processes within our bodies, enables us and those animals to struggle against any objectionable microbes which may be attempting to annihilate us, and also aids in the destruction of any deleterious organic matter which may be floating about in the atmosphere. The sunlight, to, frequently conspicuous by its absence from our stables, our byres and our homes, is a powerful agent in the destruction of micro-organisms through the agency of its chemically active rays.

These then, gentlemen, are the remarks I have ventured to place before you. Most of the statements are perhaps not essentially new, but I have attempted to present them to you in such a form as to convince you that chemistry has indeed a very intimate relationship with veterinary science, because it is inseparable from the several subjects which collectively constitute it. Were I to delete everything I have said to you, and to leave only my remarks on tuberculosis they alone should lead you to consider more fully the chemical aspect of your science, which is becoming more and more important in the eyes of the public. Looking at the monetary aspect of the subject, let me conclude by stating that I find on enquiry that the best public appointments, both at home and abroad, are being secured by men who have spent no inconsiderable

portion of their time in the chemical and bacteriological laboratories.

Professor FERGUSON next gave an address as Chairman. He said: This is the first time I have had the pleasure of being present at a lecture in the Veterinary College. I complied with Professor Goodwin's request on this occasion with great pleasure indeed, because I imagine that the students here are like the students I have been accustomed to for the last thirty years. I could have listened at the present moment to what I should have believed an introductory lecture to students of human medicine, and not of veterinary medicine. The fact of the matter is, as far as I can see, there is very little difference between the two, and the rules that apply to what I have been accustomed to—viz., to students of human medicine—apply to the students of all our medicines. The tastes of the one set resemble the tastes of the other in their having a distaste to chemistry. (Laughter.) I have tried very much on the lines of your lecturer to point out to the students the importance of chemistry. I do not want to exaggerate the importance of chemistry any more than I would exaggerate the importance of physics, or anything else, but as Professor Goodwin has shown very clearly, I do not think anyone can shut his eyes to the fact that, whether dealing with living matter or dead matter—and you are dealing partly with both, but mainly with living—no person can ignore the laws of that matter imposed upon it from the very beginning, and hope to succeed in any treatment of that matter. That is the reason that I press on your attention the subject of chemistry. Especially in what you may call vital chemistry, with which you are more particularly in contact, just as my own students are, there is a great deal of the preliminary study which seems to be of very little interest—I mean inorganic chemistry. But, after all, you will never understand organic chemistry—which is a part which more particularly appeals to you as it appeals to the medical practitioner—unless you have, at all events, attained to a knowledge of the facts of chemistry—which no human being can do thoroughly in a lifetime. Don't look upon it as a disagreeable subject, which some minds do. If you throw yourself into a single learned profession, you require to make certain preparations for it; and, above all things, if you want to furnish yourselves with tools afterwards, then you must bend your minds to get over the repulsive part of it in order that you may apply them to the parts which do particularly attract

you. I think Professor Goodwin has put a very strong case before you. He does not want you to become chemical experts, but to get a knowledge of the subject, in order to do which you must take some trouble. He has made out a strong case for you not becoming expert chemists, which you have not time to do, which it is not your business to do—but to get such a knowledge of chemistry as will be a piece of your working machinery afterwards when you come to deal with animals in a state of health or of disease. Life from the physical or chemical side is a process of change. We cannot draw a breath without a change; the moment we stop breathing, the moment the changes which are conditioned by vital action cease, then death immediately ensues, either in whole or in part. Change, then, is the physical condition of life. What the vital element is we do not know; that is another question. Physical life is physical and chemical change, and in order to understand physical life normally, and still more, abnormally, then you must study the changes which the matter composing the bodies of the animals or the people you have to deal with can undergo. Remember that abstract discoveries away from chemistry altogether are being put into our hands, new substances are being put into our hands which were perfectly unknown fifteen or twenty years ago, and the list is becoming bigger and bigger every day. The man who wants to get on in his profession will try to get a knowledge of these, and the only way he can do so is by getting a knowledge of their chemical properties. Simply as a foundation—just as you want to know anatomy at an operation, so you must understand chemistry to know your work later on. I beg to move a vote of thanks to Professor Goodwin. I hope you will take his remarks and mine as an encouragement on a subject which I have no doubt does not present very attractive features to some of you, but when once you have got a knowledge of, you will find of immense use, of immense interest, and of immense power—which is a great matter.

Professor GOODWIN, in reply, said:—"Mr. Chairman and gentlemen, I thank you very much for the attentive way in which you have listened to my remarks. They were necessarily very brief, owing to the nature of the subject, but I hope they have not been altogether too sour for you."

Rev. M. SCOTT, Bargeddie, proposed a vote of thanks to the Chairman for the exceedingly interesting and suggestive remarks he had made. He had no doubt they would be profitable to all who had listened to them.

Responding to cries of "Watson," Rev. DAVID WATSON,

Woodside Established Church, Glasgow, gave a few remarks He had attended these lectures for about the fourth part of a century, he said, but he was sorry the authorities were not inclined to give him the M.R.C.V.S. They were rather inclined to put an "N" in front of his name—non-member. It was always a pleasure to come there, particularly to see his old friend the Principal. He was very much interested in the lecture, and particularly in the enthusiastic remarks of the Chairman. He said, in all seriousness, that they could not possibly act wiser than take to heart the remarks of the lecturer and of the Chairman. Depend upon it, their future depended altogether upon the thoroughness with which they did their work as students.

Professor GOODWIN subsequently gave a demonstration on the Röntgen Rays, which was very interesting. In a preliminary explanation, he said there was a powerful searchlight as the source of the electric current. They would find what was called an induction coil, and also what was known as a Crooke's tube, or a vacuum tube, from which the air had been more or less completely extracted. By passing a secondary or induced current of electricity through this partly evacuated space, there were produced the vibrations known as the Röntgen Rays. What they were was not known very well. One authority in Glasgow believed that the rays were produced by the vibrations of that original matter or element of which all the other 70 elements he had previously mentioned were composed, the element which was believed by a great many chemists to be the starting point of everything else in nature. Personally he was not in a position to express an opinion. It was a molecular vibration which was capable of imparting to the luminiferous ether vibrations which were conveyed to our eyes through what we usually called opaque substances, that was to say, substances which did not transmit ordinary light.

NOTE ON POISONING BY ŒNANTHE CROCATA.

BY W. IVISON MACADAM, F.R.S.E., F.I.C., F.C.S., ETC., PROFESSOR OF CHEMISTRY AND TOXICOLOGY, NEW VETERINARY COLLEGE, EDINBURGH.

DURING May of this year, I had placed in my hands by Principal Williams, of the New Veterinary College, Edinburgh, portions of the intestines of certain milch cows which were supposed to have died from eating poisonous

material. The following, extracted from the accompanying letter, explains the symptoms as observed on the farm. "Three milch cows, along with others, were put out on Friday evening for the first time. They were put in a well sheltered park, in which they always were put at night during the summer time. The evening was warm and dry. Sheep had been grazed in the park for two months without evil effect, but neither cattle nor horses had been in the park since the autumn of 1896. When the herdsman visited the field the following morning he found the three cows referred to standing by themselves, but he did not notice any symptoms of illness, and as the cows generally stood together in the byre, the mere fact of their being apart from the remainder of the herd did not occur to him as being peculiar. After the cows had been milked, and whilst returning them to the park, the man thought one of the animals was more drowsy than usual, and he accordingly returned shortly afterwards to the field. On this return visit he found that the drowsy cow and two others were purging severely. One cow died about 3 p.m. the same day, the second at 10 that same night, and the third recovered. The herdsman's wife and her six-months-old baby, who had partaken of the milk of these cows at breakfast, were seized with severe purging, but eventually recovered."

The symptoms noticed in the cows were purging (thin as water), heavy breathing, shivering with spasm of limbs—animals unable to rise from ground.

The previous winter the cows had been grazing during the day on an adjoining field.

On examination it was found that the mucous membrane of the stomach was greatly congested and somewhat œdematous. No staining was noticed. Pericardium ecchymosed. Heart, right ventricle and auricle full of big dark, soft clots, extending into vessels. Lungs congested, engorged in places.

An examination of the stomachs showed them to be full of a mixture of soft and coarse grasses, rushes, some tree leaves and the seeds of an umbelliferous plant. Along with these there were portions of an evidently soft plant with pinnate leaves.

The examination showed the absence of all the common poisons, but there was decided evidence of the presence of some alkaloidal-yielding plant. On these facts being reported to the proprietor of the cows, a careful search of the field showed that an umbelliferous plant was growing in

abundance along the side of a burn, and that portions of the plant had been lately eaten. No other possibly poisonous plant was discovered in the field.

The plant was recognised as Œnanthe crocata (Zim.), the water hemlock. There are four poisonous umbelliferæ, viz.:—

Œnanthe crocata, the water hemlock or water dropwort;
Œthusa cynapium, the common œthusa or fool's parsley;
Conium maculatum, the common hemlock;
Cicuta virosa, cowbane or water hemlock.

Portions of the Œnanthe crocata leaves, etc., were then submitted by me to microscopic examination and carefully compared with particles previously removed from the stomachs of the poisoned animals, when they were found to agree in all particulars.

The Œnanthe crocata is a strong-growing umbelliferous plant, common in England and Ireland and in Southern Scotland, although less common in the Northern counties of Scotland. It is thus described in Bentham's "Flora":—

A stout branching species attaining three to five feet; the root fibres forming thick elongated tubers close to the stock; the juice, both of the stem and roots becoming yellow when exposed to the air. Leaves twice or thrice pinnate; the segments much larger than in other species, always above half an inch long, broadly cuneate or rounded and deeply cut into three or five lobes. Umbels on long terminal peduncles with 15 to 20 rays, two inches long or more, the bracts of the involucres small and linear, several in the partial ones, few or none under the general umbel. The pedicellate flowers at the circumference of the partial umbels are mostly, but not always, barren, the fertile ones almost sessile. Fruit somewhat corky, the ribs broad and scarcely prominent.

I have been favoured by the following information received from Mr. Robert Turnbull, B.Sc., Lecturer on Botany, School of Medicine, Edinburgh, and which indicates the extent of our knowledge of the action of this most poisonous plant:—

Sir J. D. Hooker, in his "Students' Flora of the British Islands," says of it: "Root-fibres as thick as the thumb, with yellow or colourless juice . . . A rank poison, often mistaken for celery."

R. Bentley, in his "Manual of Botany," says: "Œnanthe crocata, Hemlock, Dropwort or Dead-tongue, and some other species, are very poisonous."

H. Baillon, in his "Natural History of Plants," says of Meadow Saffron (*Œnanthe crocata*): "Meadow Saffron owes its name to the colour of its juice, a virulent poison, producing intestinal inflammation, speedily followed by delirium, convulsions and death." "It is the more dangerous as its root has a sweet and aromatic taste, in eating which no suspicion is excited of the deleterious character of the plant."

I have confirmed some of the above properties by eating a piece of the root, but not swallowing it. At first the taste is sweet, and then something like the taste of parsley, but ranker and hotter; I find also that the juice is colourless, but on exposure to the air it becomes yellowish, and then saffron-coloured.

Le Maont and Decaisne, in their "Descriptive and Analytical Botany," say: "*Œnanthe crocata* (Meadow Saffron). A plant growing by river sides. Root composed of oblong, fascicled tubercles, of a mild taste, containing a milky juice, turning yellow when exposed to the air, and eminently poisonous."

NEW VETERINARY COLLEGE, EDINBURGH.

Inaugural Address.

BY THE PRINCIPAL.

GENTLEMEN,—I have the honour of once more appearing before you to open this the thirtieth session of my work as a teacher of veterinary medicine in Edinburgh.

I have now been a member of the profession for over forty years, during ten of which I was engaged in active practice, first for a few months in Wales and afterwards in the town of Bradford in Yorkshire, but in 1867 I was induced to remove to Edinburgh to succeed to the late Professor Dick as Principal of the Dick College, which position I filled for six years. Why I left it is not for me to discuss at the present time, but doubtless all the mystery will be cleared some day or another.

I then opened the New College at Gayfield House and finally built this establishment, which was opened in 1883, and I am glad to say has prospered ever since, although so many changes have occurred in the curriculum and examinations as to have inflicted great losses upon all the schools, some of which are not free from debt.

Now, during the forty years that I have been associated with the profession I have seen many changes in it, changes, I might say, which have entirely altered its aspect, both professionally and socially.

Let us see what the profession has accomplished for the benefit of mankind, not only by relieving suffering and curing disease, but in the prevention and even extermination of those maladies which in former days proved so destructive to animal life and so disastrous to the owners of our flocks and herds.

As far as I can remember, pleuro-pneumonia destroyed its thousands yearly and no treatment was found to avail. Cattle were doctored in all sorts of ways, by bleeding, physicking, blistering, setoning, rowelling, in some cases mercury to induce salivation and the supposed absorption of the exudates: other practitioners employed stimulants to an enormous extent whilst others again first gave what they called a diffusible stimulant "to rouse and balance the circulation," then bled, blistered, etc. None of these supposed

curative methods and remedies were of any use, indeed, I may say, they were worse than useless.

Then homœopathy came to the front and I must confess that there were more recoveries under that method than under any other. Homœopathy at least gave nature a chance. Of course it is now understood that pleuro is a microbic disease, fatal in its general characters, the mortality arising from the fact that the microbe attacks a vital organ and that its action leads to the destruction of the functions of that organ.

But previous to the advent of pleuro, I remember that we had to cope with a new disease, viz., foot-and-mouth disease, a very different affection from the other, the virus of the disease expending its strength upon the mucous membrane of the mouth and upon the coronets of the feet, very seldom indeed attacking a vital part of the body. Veterinary surgeons were kept busy, and many added to their reputation and income by "curing" this disease, but unfortunately it was soon discovered that it ran a benign course, that it was not shortened, and but seldom modified by any active medicinal treatment. The reputations gained by the successful treatment of foot-and-mouth disease quickly disappeared when veterinarians had to cope with pleuro, although all sorts of heroics were attempted. Antecedent to this period, the practice of the art was often divided into three parts, the farrier confining his attention to the ailments of the horse, and considering himself insulted if he were asked to visit a cow, and grossly so if requested to attend a sick or lame dog. They were proud men in those days, but when they discovered that more dollars and cents were to be earned by attending cattle with foot-and-mouth disease or pleuro, they put their pride in their pockets and swallowed the supposed insult. Both diseases are now things of the past, and may never again visit our shores. In 1865 rinderpest was introduced into Hull from Russia, and some of us remember the sad havoc and the ruin of many it caused in this country. Now I want you to pay particular attention to what I am now going to say. In 1856-7, nine years anterior to the outbreak, John Gamgee was Professor of Anatomy and Physiology at the Dick Veterinary College. I was then a student and heard him repeatedly warn this country that if the Government did not endeavour to prevent its advent, incalculable loss would result. Gamgee was ridiculed by the public and hated by Professor Dick and his sister; he was, however, a true prophet, and rewarded for his prophetic warning. Well, I need not tell you, he got the

honours which are usually extended to a prophet in his own country. He was looked upon as a madman, laughed and scoffed at. Had a million of money been given to him to take the necessary measures to prevent the disease, this country would have been a gainer, and very many stock-owners saved from ruin. Professor Dick's reputation deteriorated greatly at this time, and there is no doubt but that his evidence delayed the introduction of those regulations by which we finally exterminated the scourge. Professor Dick considered the disease to be a simple impaction of the second stomach, non-contagious, and that those who said it was contagious were a lot of madmen. He believed that a contagious or infectious disease had no existence, that rabies, glanders, pleuro-pneumonia, and all other kindred diseases, were simply ordinary pathological conditions induced by weather, food or other extraordinary circumstances. If Professor Dick had not opposed those who believed in the contagiousness of rinderpest, we are sure that repressive measures would have been resorted to at an earlier period and much loss averted. Many and various were the so-called cures for rinderpest, and one Edinburgh physician seemed to think that he had discovered the panacea. Even a few weeks ago a letter appeared advocating his (the physician's) treatment in South Africa.

As to the treatment of cattle plague there was none. The disease ran a generally fatal course. Some very few recovered. As to its prevention by inoculation you are aware that the great German pathological and bacteriological expert, Koch, was sent to South Africa to devise measures for arresting the disease there, and you are also aware that his recommendations have not turned out successful. Many think that preventive inoculation will never succeed. I am not one of those having full faith that success will follow when a proper vaccine has been discovered, and I am glad to inform them that Mr. Davis from this college seems to be on the way to discover it, and according to the papers he is not only a successful vaccinator, but is looked favourably upon by the "Chiefs." Now with regard to contagious diseases generally, it is now well known that they are microbic diseases, and that they run a definite course, sometimes benign and ending in recovery, often malignant and destructive to the majority attacked.

Amongst the benign we may place, amongst others, foot-and-mouth disease, variola vaccinia of the cow, strangles, and some forms of influenza of the horse; amongst the more

serious, the pink eye and chest influenza of the horse, contagious mammitis of the mare, cow, and sheep, and amongst the malignant and generally fatal, glanders of the horse, rinderpest and pleuro-pneumonia of cattle. There is a remarkable difference here between rinderpest and pleuro. The first is communicable from cattle to sheep, but the latter is confined to the ox tribe. Of course I might include other contagious diseases, such as the distemper of the dog. There is a curious fact connected with microbic diseases; some are contagious and infectious, whilst others, although undoubtedly due to microbic life, are never communicated except, perhaps, by actual inoculation. Take tetanus, for example; here we repeatedly meet with it in a large stable full of horses, and seldom or never do we meet with more than one case at a time, although the bacillus tetani is undoubtedly present. But what is more remarkable still is the non-contagious nature of tubercle in the horse. I have met with many—very many—instances of tuberculosis in the horse involving the lungs and other organs, but have never met more than one case at a time in the same stable, although that stable might contain a dozen or more horses, breathing the same atmosphere and drinking from the same trough or bucket as the diseased horse. Contrast this with tuberculosis amongst cattle; here we find it to be most highly contagious. It is again remarkable that sheep, so far as this country is concerned, do not suffer from tuberculosis, and the goat but very seldom. These problems are not solved, and I shall leave it to some of you to solve them, feeling assured that your time and talent will be well repaid. One thing, however, I wish to hint at, namely, that there is a possibility yet of obtaining a vaccine for tuberculosis by cultivating an antiptomaine in the circulation of the horse or sheep. So far as rinderpest, pleuro and foot-and-mouth disease are concerned, the veterinarians of this country have successfully combatted with them and driven them from our shores; but they have done more; they have successfully exterminated many other diseases that were of a non-contagious nature; for example, periodic ophthalmia, which caused blindness in many horses. In my younger days we were never without this eye disease, and do what we would we could effect no cures. Thanks to the efforts, particularly those of Coleman, we seldom or never see a case of it, and cataract is very rarely seen. Again, take poll evil, fistulous

withers, quittors, and even navicular disease — ailments so common 30 years ago. Where are they now? Let us look back upon the barbarous custom of firing horses for the purpose of strengthening their legs, and of periodical bleedings. All these barbarous customs have disappeared from the face of the earth, at least, so far as Scotland is concerned. What is all this due to? I answer, unreservedly, to the advancement of knowledge, and the honest carrying out of that advanced knowledge by the members of our own profession. Seeing that we have been able to exterminate so many diseases, and that we have done so very much against our financial interest, may we not expect, even yet, that some recognition shall be given to us during this present very auspicious year of Her Majesty's reign. Her Majesty has no subjects in the world more loyal than those of our own profession notwithstanding all this, this great year is passing away, and we have received no mark of recognition or approval. I speak not for myself, as I represent the youngest college in this country. May I ask the question, have we, as a profession, done anything to counteract the benefits we have conferred? On the continent of Europe veterinarians as well as members of the medical profession receive honours and decorations for work performed for the benefit of the public. Are they more worthy than we? It is very true they act under more favourable auspices, being appointed and endowed by their respective Governments, which provide all the appliances and bear all the expense requisite for scientific investigations, whereas we are compelled, if we desire to keep pace with the times, to provide our own appliances and to devote our time and energy without any hope of State assistance. Even America puts us to the blush, for there are laboratories, well appointed in every way, where medical men and veterinarians are appointed by the State to conduct scientific work. There we see physicians and veterinarians working hand in hand, whilst in our own little island we have had experience of an attempt to put us down by the medical men of Scotland, who attempted to allocate to themselves the duties of the veterinarian in the Public Health (Scotland) Act. Whilst I acknowledge that more scientific work and more original discoveries have been made by our Continental brethren, I claim that we are even more practical in working out the details of the profession as surgeons; avoiding performing many cruel operations which we consider useless, and extending much more humanity towards our patients; whilst as physicians we claim that we are greatly in advance

in our treatment of internal disease. I need not refer to particulars, beyond mentioning that what we did in the way of bleeding, blistering, and physicking 30 years ago is often done on the Continent now. To compare the practice of the present time in our own country with that of 30 or even 20 years ago. I may mention that ordinary cases of influenza in the horse were bled, physicked, and blistered without the slightest consideration being given to the general state of the patient. No matter how debilitated and depressed the animal might be, the fleams were struck into him, and four, six, eight, or ten quarts of blood abstracted; then he was dosed with aloes, tartar emetic, calomel, etc., his breast and sides dressed with strong mustard or severely blistered, or on the other hand bleeding and depressants were avoided, and large doses of stimulants, whiskey, brandy, etc., administered every few hours. It is not many years past since the horse owners of Edinburgh had a taste—and a very bitter one—of this line of treatment. Unfortunately, there remain a remnant of this method yet amongst us, and we hear of men even now boasting of the heroic methods which they adopt, but the time is fast approaching when the prejudices of the past would disappear, and when men would look upon and treat diseases from a physiological standpoint.

Now, ladies and gentleman, I cannot conclude this address without referring to the loss sustained by the profession by the death of Mr. Finlay Dun, who was once a professor at the Dick College, and for many years one of the Board of Examiners, first for the Highland Society's certificate, and afterwards for the R.C.V.S.

THE FIRST LADY VETERINARY-SURGEON IN EUROPE.

A NEW phenomenon in the medical world, the first woman who has attached herself to the veterinary profession, is, we learn from the *Eclair* of 1st August, 1897, Mdlle. Marie Kapczewitsch, the daughter of a wealthy Russian family. Being resident for a pretty long time in Paris, she began six months ago to attend the clinical lectures at Alfort, with a view to being able to look after her own animals medically, but she became so enamoured of her veterinary studies that she entered as an ordinary student, attended classes for eight terms, passed her examinations excellently, and obtained a veterinary diploma.—(Translated from the *Deutsche Thierarztliche Wochenschrift*, No. 37, of 11th September, 1897.)

AN ABSCESS IN THE THORACIC CAVITY OF A HORSE.

BY J. CONNOCHIE, JUNR., M.R.C.V.S., AYTON.

Subject.—A chestnut thoroughbred gelding, rising six years old.

History.—He was bought at a hunt sale on June 10th, and two days afterwards was observed dull and disinclined to feed. This was attributed to the horse taking what is commonly called "cold," and so nothing serious was anticipated. However, there was no cough nor discharge from the nose, and, as he was not getting either better or worse, professional attendance was requested.

Symptoms.—When first seen he appeared dull and listless and not inclined to move much. The pulse was accelerated and of a quick, jerky nature, and the temperature was 103½. The breathing was slightly hurried and abdominal, and a slight tremulous movement of the breast was apparent. The visible mucous membranes were infected, and there was stiffness of gait and slight œdema of the limbs.

Treatment.—It is unnecessary to enter fully into all the details of this case; suffice it to say that he got the best of nursing all through, and medicinal treatment calculated to do no harm at least if it did no good. The latter was discontinued after being persevered with for three weeks, as it was evident from the aggravation of the symptoms and the rapid emaciation that the case would have a fatal termination.

From the first heart mischief was suspected, as auscultation over the region of that organ revealed it to be beating in rather a palpitating manner, with a hard, metallic ring about it. The lungs at first seemed only a little congested, but latterly there were distinct evidences of pleuro-pneumonia and hydrothorax, from which he eventually died.

Post-mortem.—On opening the thoracic cavity, an enormous quantity of reddish-brown fluid escaped; exposing the lungs coated with coagulated lymph, bands of which connected them with the ribs. They were greatly consolidated, and showed red and grey hepatization in varying degrees.

The most noticeable lesion, however, was a bladder-like swelling, about the size of a man's head, situated on the inner aspect of the left side of the cavity, low down in front of, and, in fact, displacing the apex of the heart. On opening this swelling, a large quantity of ripe-looking pus escaped; it had the usual creamy look and consistency, and was free from smell. The walls of the abscess, if that is the proper term for the swelling, seemed to be composed of thickened

pleura costalis. Although a careful look-out was kept for any trace of a foreign body, nothing was observed, and it was concluded that this was a stray abscess in a case of irregular strangles, but the horse's previous history from his earliest youth shows a clean bill of health. The direct cause of death seemed to be the displacement of and the interference with the heart by the abscess.

Army Veterinary Department.

THE undermentioned Veterinary Officers embarked in P. O. ss. "Caledonian" on 1st October, for a tour of service in India:—Vet.-Major G. D. Whitfield, Vet.-Captains J. B. Savage, R. W. Burke, E. R. C. Butler, and Vet.-Lieutenant A. C. Newsom.

The following transfers of Veterinary Officers have taken place:—Vet.-Major J. K. Grainger from Weedon to Newcastle; Vet.-Major W. A. Coorv from Chatham to Exeter; Vet.-Major D. C. Pallin from Canterbury to Chatham; Vet.-Captain R. W. Raymond on return from special duty in South Africa to 8th Hussars, Cahir; Vet.-Captain J. Caspar on return to duty from sick leave of absence to 6th Dragoons, Dundalk; and Vet.-Lieutenant W. A. Pallin from 8th Hussars, Cahir, to Newbridge.

Vet.-Lieutenants H. M. Lenox-Conyngham, W. A. Pallin, and P. J. Harris have been placed under orders for early embarkation for India.

Vet.-Lieut. E. W. Lander has been presented with a testimonial on vellum by the Royal Humane Society for "assisting in saving from drowning a fireman belonging to the ss. 'European,' by jumping overboard from ss. 'Duncan,' at Cape Town."

Extract from *London Gazette*, September 28th, 1897:—"Vet.-Major J. W. Evans is placed on half-pay, on account of ill-health. Dated 29th September, 1897.

"Vet.-Major J. W. Evans, half-pay, retires, on retired pay. Dated 29th September, 1897.

"Digby Bolton, gent., to be Vet.-Lieutenant in succession to Vet.-Major J. W. Evans. Dated 29th September, 1897."

AN epitome will be given next month of recent patents more or less connected with the profession.

Editorial.

A PROPHETIC VISION.

BEING A LECTURE TO BE DELIVERED BY THE PRESIDENT OF THE ROYAL ZOOLOGICAL SOCIETY AT THE OPENING OF THE SESSION, NOVEMBER, 2097.

GENTLEMEN,—I propose this evening to discuss some interesting questions connected with certain extinct species of domestic animals. You are, I presume, all acquainted with the recent discoveries in a mound near Exeter of fossilised bones which have been proved to belong to no species of animal presently existing. It was at first thought that these bones might be part of the skeleton of the *Bos Taurus*, an animal which still survives, though, we believe, greatly modified from the creature of the same name which was known to our ancestors and which is described in ancient scientific works written by Pliny, Buffon, Cuvier, Fleming, Williams, and others. The quaint descriptions given by these venerable writers of the domestic animals of their day, and the rules laid down by them for the breeding and rearing of cattle are, I may add parenthetically, most amusing and, when read in the light of modern science, quite amazing. Still one must admit that there were giants in those days and, if they did not know much in comparison with what we know, they showed, in spite of much barbarity and ignorance, a tender regard for the animals committed to their care which we seek in vain in this enlightened twenty-first century. To return to our bones, it was surmised by myself that they might possibly be those of that formerly important but now quite extinct animal the horse (*Equus caballus*) and I accordingly proceeded, with the help of diagrams which I found in our only copy of Williams—now of priceless value—to reconstruct the skeleton of the horse. I may be pardoned for digressing a moment to say that this copy of the old surgeon's book, written in that strange old-fashioned-English style that characterised the bygone days of the nineteenth century, is of more than scientific interest. It seems to have belonged to a student of the veterinary colleges of those stupid days before our universities recognised the educational importance—not to speak of the financial profit—of attaching veterinary teaching to their own medical course; it is interspersed with notes of a despairing kind written by the owner, who looked forward with dread to some approaching examination; it contains many remarks—shall I say of an uncomplimentary nature?—with respect to the author of the

book, the College of Veterinary Surgeons, the examiners, and the human race generally. I am not an authority on nineteenth-century English, but Dr. Syntax of the University of Oxford, who has made a careful study of the marginal notes, tells me that although very shocking, they contain valuable information as to the expletives used by the young men of those far-away times. Some of the phrases still survive, and these, I understand, have some reference to eternal perdition; others have vanished, leaving no trace of their origin or their fate. Dr. Syntax says that a certain word "bally," which occurs frequently, is a perfect puzzle to him; he finds traces of it in contemporary English periodical literature, mostly of a comic sort, but what it meant he does not know; he believes it to be an outgrowth of the second half of the nineteenth century, and to have died with that century. As illustrating the rudeness and barbarity of the times, it appears that that dreadful word "bloody" occurs no fewer than twenty-nine times in the marginal notes; it seems almost to have been a term of endearment in some cases—incredible though that may appear, and at any rate was applied to teachers and disciples alike. Thank Heaven, those rude old days are far behind. Well, gentlemen, I proceeded slowly and patiently to fit bone to bone, and to my intense delight I found that I was on the right track, and that I had before me the means of reconstructing the skeleton of that once famous animal, *Equus caballus*. I need not trouble you with details. You all know how Owen, from a single bone, by a process of inductive reasoning, reconstructed the skeleton of an extinct bird, and made a drawing which, when the actual skeleton was found at a later date, turned out to be correct in the most minute detail. My task was not nearly so difficult; all the bones except the right femur and the left tibia were at hand, and those that were wanting have been replaced by plaster casts. You now see before you on this platform drawings showing the skeleton of this strange animal, and others, reproduced from old plates by my friend Professor Pictor, showing the horse as he lived and moved in ancient times. Professor Pictor has given himself great trouble in discovering old books and prints pourtraying the horse at various stages of his existence, and he has certainly been successful in giving us pictorially his complete history. The Society owes him a deep debt of gratitude for his generous efforts.

I do not propose this evening, gentlemen, to go into the question of the rise and development of the horse. Such a

study, besides being too long for this lecture, falls rather within the province of the biologist, or the historian; I propose to deal, for the present at least, only with the decline and fall of the noble animal.

On careful investigations I find that symptoms of decay set in somewhere about the end of the reign of Victoria. Threatenings of extinction to the horse had been heard in the early part of Victoria's reign, when what our ancestors called railways were first introduced, and the filthy—now, thank Heaven, antiquated—steam-engine began to be more widely employed. Great lamentations were heard all over the country, among farmers and land-owners, and the horse was looked upon as a doomed animal. The prophecy was false, or at any rate, premature. The era of steam was the triumph of the mercantile, I might say of the middle class, what our French friends used to call *la bourgeoisie*, but they fell to imitating the nobles, whom they had to some extent displaced, and began to take an interest in the horse as an animal that befitted a luxurious style of living and lent a glamour and a distinction to their way of life. Besides, it was found that railways had not fulfilled all their expectations and still required the support and co-operation of the horse. Accordingly for a time the breeding of horses went on apace and the prophets of evil who had prophesied his extinction were laughed to scorn, as all men are who are in advance of their times. Nevertheless, the doom of the noble animal was sealed, and no hope was left of rescuing him from his destiny. Gradually his usefulness was undermined; a machine called a bicycle, because it had two wheels, was invented and at once became enormously popular amongst our ancestors of the later Victorian era; costly at first, and used only by the wealthy classes, it gradually fell in price until it came to be used by message boys going their daily rounds; rural postmen were supplied with this handy machine by a thoughtful Government, country doctors and clergymen—nay, even those who lived in towns—began to go their rounds on bicycles, finding them less expensive and more manageable than horses, and as two, three, four and even six people could ride on a cycle together, the use of these machines rapidly extended and rendered the use of a dog-cart (what a strange flavour of antiquity the name has!) or other horse-drawn carriage—a sort of antediluvian luxury. Elderly men like myself have their recollections of one of these cycles which used to be shown in the Victorian room of the British Museum, but which fell to pieces through rust and decay. In

the reign of Edward the Seventh, the son of Victoria, the bicycle driven by the foot was replaced by one driven by electricity, capable of running at thirty-five miles an hour, and manufactured at so low a price that the poorest workman could purchase one to convey him to and from the scene of his daily labours. This, of course, was another nail in the coffin of the poor horse, and a few more nails were added when the Duke of York became King under the title of Edward the Eighth, and Professor Schwinger, of London University, under the auspices of the young monarch, gave to the world his flying carriage, which added such a charm to the lives of our grandfathers. You all know how wonderfully this machine was improved in the reign of Edward the Ninth—great-grandson of Victoria, and born during her reign—and of the sovereigns who have succeeded him, and how it has revolutionised our social life.

I return to the beginning of the twentieth century. Our ancestors began to find that horse-haulage on the streets of great cities was both expensive and inconvenient. It was found, also, that a public conveyance drawn by a pair and, in hilly towns, sometimes by four horses, took up too much street-room; accordingly a new mode of traction was introduced, mechanical, of course, and horses were discarded in great numbers; grooves were cut in the streets, in which endless wire-ropes were laid, and to these the public cars were ingeniously attached in such a way that they could be propelled or stopped at the will of the driver by a slight turn of a wheel. This was considered a great advance by the people of the time, and banquets were held and speeches, fervid with hope and gratitude, were delivered by mayors and provosts when "cable-car systems" (as they were quaintly termed) were inaugurated. Whilst rummaging in the British Museum lately, my friend, Dr. Syntax, found an old file of a newspaper called the *Scotsman*, which seems to have had great vogue at the time, and was really a very creditable production for our ancestors; in the issue for 15th May, 1898, he found a notice of a civic banquet held in Edinburgh on the preceding day in which Lord Provost M—— speaks in glowing terms of the prospects of the city under the newly-opened cable system. Curiously enough, in the same paper, we find a lecture, delivered by Williams to his students, a veritable threnody on the approaching extinction of the horse: he little knew how near his prophecy was to fulfilment! Before leaving this point I would refer my younger listeners to the history of locomotion for

information as to the rapid improvement of public conveyances—how cables were superseded by electric and magnetic modes of traction and these by the wonderful appliances of to-day.

I pass on to the conveyance of goods. I have already spoken of the noisy, smoky steam-engine of the Victorian era, which was in its day a wonderful instrument, but which was found to be too heavy and too expensive for the work it had to do; besides, the gradual exhaustion of the coal supply of the country rendered it absolutely essential to look about for other means of propulsion. Accordingly, in the earlier part of the twentieth century, electric engines were introduced into the railway systems of the country, and these answered the expectations formed of them so fully that their use extended with extraordinary rapidity. Light railways were laid down all over the country; every country road had its track, fenced or unfenced, along which trains of passenger-carriages, or waggons containing agricultural produce or other goods were constantly travelling. Where there were no such lines, carts, or carriages automatically propelled and guided by the occupant began to run along the ordinary road surface, and these were so perfect in construction, so easily managed, so cheap and so rapid, that in the year 1950 a vehicle drawn by a horse was an object of such rarity that people gazed upon the spectacle as their ancestors had gazed on the now long-extinct lion and tiger. Efforts were made by country gentlemen and others to preserve the horse for the chase and for other purposes, but their efforts were vain—the fox disappeared about 1960, and since then many other wild animals known to our forefathers, such as the hare, the stag, the otter and the badger, have become quite extinct. In the army, as artillery became the preponderant power, and unerring precision was at last attained in our field guns—just as in the case of our small arms—cavalry were found to be useless and were consequently disbanded; mechanical power was used for the transport of field-guns and found to be better than horse-traction.

Thus, gentlemen, the splendid animal which had done such brave service to our ancestors went to his death. He had attained the perfection of beauty and strength, but the decree of fate went forth and steam and electricity killed him. He became extinct about 1990 and now only his bones remain—he is a fossil animal.

Proceedings of the Veterinary Medical Societies, etc.

SOUTH DURHAM AND NORTH YORKSHIRE VETERINARY MEDICAL ASSOCIATION.

THE ninth annual meeting and dinner of this Association was held on Friday, September 24, 1897, at the North Eastern Hotel, Darlington.

There were present: Professor Williams, Edinburgh; Messrs. W. N. Dobbing, C. G. Hill, and J. H. Taylor, Darlington; A. Peele and Dr. de Jong, Hartlepool; H. Peele, Durham; P. Snaith and J. G. Deans, Bishop Auckland; J. Wilson, Yarm; A. Neish and E. H. Pratt, Northallerton; P. W. Dalling, Loftus; G. E. Gibson, Sedgefield; W. H. Blackburn, Barnard Castle; E. R. Gibson, Houghton-le-Spring; W. J. Foreman, Leadgate; and W. Awde, Stockton-on-Tees. A telegram having been received from the President (Mr. H. H. Roberts), regretting his inability to attend the meeting, the Secretary proposed that Mr. W. N. Dobbing, one of the Vice-Presidents, take the chair; seconded by Mr. A. Peele, and carried.

The minutes of the previous meeting were taken as read, and confirmed. Proposed by Mr. Taylor, seconded by Mr. H. Peele. Mr. A. Peele then produced a pig's heart, taken from a pig examined for the Board of Agriculture, showing a very well marked case of verrucose endocarditis. The Secretary produced a calcified trachea from a horse in which a tracheotomy tube had been temporarily inserted about 12 months before. On his attention being called to the case, the trachea was very much thickened, and the owner said that it interfered very much with him during severe exertion, and requested that a tube be put in again. On cutting down on the rings it was found that calcification had taken place, however, after much trouble, an opening sufficiently large enough was made, and a tube inserted. Three days after this he was summoned to the place in a hurry, but arrived just as the horse had breathed his last. On enquiry the attendant stated that there was a large quantity of blood escaped before death. On post-mortem there was bleaching of lungs and internal organs, showing that a large quantity of blood had been abstracted and on the mucous surface of the trachea there were some vascular tufts and blood staining here and there. Professor Williams stated that he had met with a similar case, but his died during the operation for the insertion of the tube, and he recommended that in any similar case met with the operation should be performed lower down the neck than the calcified spot, and there was a greater possibility of the operation being successful.

Professor Williams also said that recently he had met with a case of diabetes in a horse 18 years old, which was very fat. He gave him oil and aloes, and the horse purged very freely. He took nothing in the shape of food, but had thirst upon him, and drank cold water, his appetite never returned, and he lived for 21 or 22 days, practically without food. On a post-mortem being made, food was found in the stomach and large bowels. Mr. A. Neish stated that he had met with a case of obstruction of bowels in a horse in which he found an abscess on the floor of the rectum which he lanced with an embryotomy knife, and the case made a good recovery.

Mr. Taylor produced a portion of intestine from a dog which had suffered from irritation of the bowels, the coats of which had become very much thickened, and the lumen of the bowel was almost closed.

Mr. A. Peele proposed, and Mr. Gibson seconded the nomination of Dr. de Jong, and the Secretary proposed, and Mr. Neish seconded the nomination of Mr. W. Hunting, of London, as Honorary Associates; and Mr. Deans proposed, and Mr. A. Peele seconded the nomination of Mr. P. W. Dalling, M.R.C.V.S., of Loftus, as a member of the Association.

The Treasurer then submitted his annual report, the balance-sheet showing the financial position of the Society. from which it appeared that there was a balance in favour of the Society of over £20.

In the absence of the President there was no inaugural address.

Professor Williams then gave the members the benefit of his experiences in Jamaica while investigating disease amongst cattle in that country, and exhibited numerous micro-photographs showing the various changes undergone by the blood in connection therewith.

Several questions were put to the Professor by the members present and answered by him, after which a hearty vote of thanks was accorded on the proposition of Mr. Snaiths, seconded by Mr. Hill, and carried by acclamation. Professor Williams having suitably replied, an adjournment was then made for dinner.

Mr. Dobbing again presided at the dinner, and gave the usual toasts of "The Queen," "The Prince and Princess of Wales, and the rest of the Royal Family." Mr. Taylor proposed "The Army, Navy, and Reserve Forces," to which Captain Peele responded. Mr. Peele proposed "The Royal College of Veterinary Surgeons," and Professor Williams responded to the toast. Mr. Smith proposed the toast of the "Sister Profession," and Dr. de Jong suitably responded. Professor Williams then proposed the "South Durham and North Yorkshire Veterinary Medical Association," to which the Secretary replied. Mr. Hill proposed the toast of "The Visitors," and Mr. Dalling responded. Mr. G. E. Gibson having proposed that of "The Press," and one of the reporters present having replied, one of the pleasantest meetings of this Association was brought to a close. Mr. C. Stephenson ably presided at the piano.

W. AWDE, *Hon. Sec.*

THE CENTRAL VETERINARY ASSOCIATION OF IRELAND.

REPORT of proceedings at a meeting held at Hayden's Hotel, Ballinasloe, on Tuesday, October 5th, 1897. Mr. D. Fulton, Mullingar, President, occupied the chair. Others present:—Messrs. E. C. Winter, J. W. Martin, M. J. Cleary, J. J. Vahy, W. C. Patricks, J. W. Nolans, E. C. Boltons, O. D. Coll, J. Freeman (Dublin), P. J. Howard, C. Rea, C. Concannon, P. Walshe, A. J. Moffatt, W. A. Byrne and A. Watson, Hon. Sec. (Dublin).

Mr. WATSON read the minutes of the previous meeting, which were confirmed, and pointed out that the Association was formed on the 22nd July, 1897, at a meeting in Mullingar, the following officers being selected:—D. Fulton, President; V. P. Watson (Boyle), Vice-president; E. C. Winter, Treasurer; and A. Watson, Honorary Secretary.

Mr. CLEARY explained what had occurred at the Mullingar Horse Show, where he refused to act, as the Show Committee wanted to establish a kind of court of appeal.

Mr. WATSON proposed a number of new members who were elected unanimously.

The President's Address.

Mr. FULTON, rising, said—Gentlemen, in taking my place before you this evening in the capacity of President, and assuming for the first time the responsibilities of that office, I labour under a considerable degree of diffidence, being well aware of my own imperfections. Nevertheless, I cannot but feel proud of the distinguished and honourable position in which you have placed me, that of presiding over this Association. But I must confess I doubt whether you have got the right man in the right place. I very much fear, too, I shall not be able to infuse that vigour and

energy of mind and earnestness of purpose which ought to emanate from the chair, and be influential to persuade and animate each member individually; but with your support I will do my best. In taking a retrospective glance at our profession, there are many things upon which we are entitled to congratulate ourselves, but there are still some which we must regard as a blot and stain upon our escutcheon. Our object, therefore, as professional men, should be to multiply as much as possible the former and radically root up the latter. I am not one of those who take a desponding view of the veterinary profession. That we do not stand so high in the estimation of the public as we have a right to expect, I am quite willing to acknowledge; but the fault is principally owing to us as individuals, and not as members of the profession, for, although the profession does not prevent a gentleman from being received as one, yet, unlike either the clerical, legal, and medical, it does not give him a status in society, unless he individually, by his private and professional conduct, deserve it. It is, therefore, the bounden duty of all members of the profession who have the well-being of veterinary science at heart, to do all in their power as individuals to raise the profession to the position she has a right to occupy. This can only be done by showing the public that we are really what we claim to be—thoroughly scientific men, willing and able to keep pace with all collateral branches of science with which our profession is so intimately connected. Amongst the foremost objects of Provincial Veterinary Associations is unquestionably the study of epizootic and enzootic diseases, not only with a view to the adoption of the best modes of treatment to combat their effects, but more particularly to the employment of the necessary means to prevent them or their re-appearance, or, where this is impossible, the adoption of such measures as shall reduce their fatality or deteriorating consequences to the minimum point. Surely the most efficient way of obtaining such desirable results is to be found in discussing the general as well as the particular character of the diseases themselves, by a number of professional men engaged in the study of such diseases who possess the opportunity of doing this in many and widely-separated districts, where each of these affections may assume a modified form or character. No true and earnest worker, be his field ever so limited, can fail in making a certain amount of progress, but if he has not the power or opportunity of comparing the resu lts with those obtained by others, and of thus extending, as it were, the scope of his observation he must labour at a great disadvantage, and incur the risk of constantly being in error, or at best he is only compensated for loss in general range by what he gains in some special department. Another important and unlimited subject for our investigation and discussion is the hygiene of domesticated animals. It is one which will repay all who have the opportunity, and are willing to labour for the benefit of others, and for the advancement of our knowledge of so important a branch of science, inseparably connected with veterinary practice. For my own part I must confess that I consider the study of hygiene to be of far more importance to the veterinary surgeon than the study of therapeutics, for surely there is much more true philosophy, and more noble scientific research in the prevention of disease than in the cure of it. I do not wish to assert that three-fourths of the disease of the lower animals arises from insufficient attention to the laws of hygiene. Surely at the present day when agriculture is making big strides, here the largest portion of our farmers are beginning to nod and think and reason for themselves upon the everyday facts brought before their notice. When clever business men, bent on making money, are concocting concentrated foods, and when the ——and Thompsons are detecting the adulteration and exposing the importations of the vendors of the food of man, it is not for us to allow men out of our profession to detect the adulterations and importations

of the vendors of the food of quadrupeds. No, this should be the duty of the veterinary profession. If she delegates the most important scientific part of her duty to men outside her pale, what right have we, her notaries, to complain if the public judge according to our fruits. Again, when the professional veterinarian meets with the well-educated farmer or proprietor of a large number of animals who has studied Carpenter, Liebig, or Johnston, and filled his well-trained mind with useful information, what opinion would he arrive at when he found that many amongst us scarcely took sufficient interest in reading "even to read" our own monthly periodicals—much less to study this subject, upon which the authors mentioned had written. I apprehend that such a man as I have just sketched—and there is many a one to be found amongst the veterinary surgeon's best customers—would not be long in forming his opinion as to how far such persons were entitled to rank with the scientific and educated of other professions. Another important subject for an association such as we have this day commenced should be to investigate the laws of breeding in all our domesticated animals, especially the horse and the ox. No one has the ear of the breeder of animals so much as the veterinary surgeon, and as a rule his advice is asked and acted upon, where he holds the position he ought amongst his employers, for no one has the same opportunity for observation. On such a subject as this he ought ever to be noting down facts, reasoning upon them, and deducing therefrom lessons of importance to the agriculturist, and through him the whole nation. I feel certain that the members of the veterinary profession would do well if they took a greater interest in the breeding and rearing of agricultural live stock than they do. It is giving our customers, even gratuitously, good sound advice arrived at only by years of observation and research, which will make them appreciate the educated and scientific man more than the man of mere routine. Having now touched upon a few of the subjects which in my opinion should occupy part of our time at our quarterly meetings, I shall in conclusion briefly notice a few of the rocks and quicksands off which our professional *confrère* must be exceedingly careful to steer, or she will go to pieces, and the compound body will rapidly assume its elementary forms. The first in importance is that no personal matter should ever be allowed to enter into our discussions. There is as we all know a certain amount of clashing of interests between professional men of the same calling everywhere, and the veterinary profession is no exception to this rule. Hence it should be thoroughly understood that the least allusion to anything of a personal nature should be considered as an insult to all the members of the Association. If this Association is to go on and be of any use to us as professional men, we must firmly maintain this position, or, so to speak, rally round this point as one of honour. I press this the more earnestly because I know this has been the rock upon which societies in the medical profession have foundered. Another shoal we should steer clear of is the rate of remuneration we receive for our services. This, in my opinion, should be left an open question, for every man has a right—a perfect right—to put his value on his services. If one man thinks his services are not worth more than one half that of his neighbour, by all means let him take the half, for the probability is if he did not, he would think that he was doing an act of dishonesty to his employer. Low-priced professional services are, as a rule, like all other low-priced articles, thrown aside by all sensible men as being by far the most expensive when tested and brought into use. I will not further occupy your time by additional remarks of my own, more especially as I know there are some interesting topics to be discussed which will doubtless interest you far more than anything I may be able to bring before you in this address. I must, however, before I conclude, award honour to whom honour is due. It may not be

known to all of the members that the sole merit of bringing together so many of us to-day, and the establishment of the Irish Central Veterinary Association, is due to Mr. Cleary, V.S. I confess that when the matter was mentioned to me I had not much faith in it, although I did not pronounce its failure, not because I could not see its value, but because I feared the want of unanimity amongst the members of this profession in the surrounding districts was not sufficiently felt. However, Mr. Cleary was nothing daunted in his undertaking, and now I can say that no one is more delighted than myself to see his sanguine expectations so fully realised.

Mr. COLL: It is, I think, a duty we owe to each other to pass a vote of thanks to the President for the address which we have just listened to. He has touched on many subjects and done it well. I think all of you will agree with what he said, and all appreciate the language in which his address is clothed. The rock of want of unanimity is one upon which, as you all know, many societies have struck. I have very much pleasure in proposing a vote of thanks to the President for the splendid address which we have just heard.

Mr. FREEMAN seconded, and the vote of thanks was passed amid acclamation.

Mr. WATSON said the resolutions proposed at the Mullingar meeting were considered by some members of the Association as vague, ambiguous, and embarrassing. He would read them over for the meeting. A copy of them would be sent to each member, and they could be discussed at the Dublin meeting in January.

Mr. BYRNE: I would be very glad to hear them read now.

1. Resolved (proposed by Mr. Watson)—

> That this Association protests against the conditions relating to the veterinary examination of horses at shows, which allow of or tend to encourage exhibitioners, or other interested outside parties, to challenge, or appeal against the officially announced veterinary opinion, with respect to the soundness of a horse, once that opinion has been issued by appointed stewards.

2. Resolved—

> That this Association deprecates the acceptance by veterinary surgeons of appointments at any horse show unless conditions under which the examination of horses is conducted, provide that, once the show committee issues the opinions of the appointed veterinary surgeons, such opinions shall be considered and upheld as final by the executive of the show.

3. Resolved—

> That any system of veterinary examination adopted at horse shows, which sets the opinion of one appointed veterinary surgeon against that of another, instead of allowing of differences of professional opinion being determined in consultation, militates against the interests of the profession, besides being contrary to courtesy, professional etiquette, and derogatory to all parties concerned.

4. Resolved—

> That we consider it unfair to private practitioners of the profession that certificates as to soundness of horses be given by any horse show executive to owners, or other parties unofficially connected with the show.

Mr. CONCANNON: I beg to propose that those resolutions be approved of. I think they will meet the views of all.

Mr. COLL: They are very mild.

Mr. WALSHE: I think they are not strong enough.

The resolutions were approved of and their consideration adjourned to the January meeting in Dublin.

Mr. WATSON said they would remember that Mr. Byrne promised to read a paper for them at that meeting, and he now called upon him to do so.

Mr. Byrne then read the following "Veterinary Ethics" :—

Gentlemen : The subject of my paper is, in a sense, a very difficult one, for although it treats of matters which concern the veterinary surgeon in his everyday work, it at the same time touches on abstract questions which trouble him very little, and with which a busy man in the country is badly qualified to deal. In bringing this subject then before the members of the Irish Central Veterinary Society I recognise that I owe them some explanation.

It seemed to me that we, Irish Veterinary Surgeons, are, as veterinary surgeons, very much isolated ; that there seemed to be an absence of that spirit of *camaradie*—that bond which common interests and common dangers call into existence. As one who felt this very keenly I thought I would sacrifice the ambition which every man has to do his best when called upon ; that I would not select for this, the first meeting of our Society, a paper on my pet disease, but bring before you rather a subject which would afford to everyone an opportunity of setting forth his grievances, his complaints, his causes of dissatisfaction or discontent ; so that, discussing these matters in a broad spirit of mutual tolerance, a firm foundation might be laid for better things. We are not concerned here with those who think of joining our profession, with their qualifications, their experience, or their pedigree, and having no immediate concern—indeed, now only a pleasant memory of happy years in Camden Town, Auld Reekie, or the smoky city on the Clyde—we leave the guileless student to the tender mercies of forming bodies, and members of Council. We have to consider the position of the man who, having spent four or more years at College, has spent hundreds of pounds, has worked more or less hard, and having obtained his diploma has to endeavour to make his living as a veterinary surgeon. If, through inheritance or purchase, he acquires an already established practice he probably works along old lines, broadened by the trend of 19th century enlightenment. But if the newly qualified veterinary surgeon has to commence practice in a district where he is unknown, about the first ethical question forced upon him is the difficult one of advertising.

I asked the opinion of a valued friend of mine in the profession as to advertising, and he told me that he considered it derogatory, that it lowered the dignity of any profession, and that medical men having got on without it, we should endeavour to do the same. This is, I think, the common view of this important question, but I submit that this view is absurd, inconsistent with the spirit of this enlightened age, borrowed by us from medical practitioners, whom we slavishly imitate, and that it should no longer be held ; we do not advertise because we do not think it respectable, because doctors do not advertise and quacks do. Mrs. Grundy says "Don't," and we mustn't be out of the fashion. We condescend to admire Shakespeare, although his works have been advertised, criticised, and brought under the notice of all the world for 300 years. But he was only a stupid sot who stole deer and held horses, and knew no better at the time.

Charles Dickens, having exhausted the novel advertising mediums, carried a sandwich board from the Atlantic to the Pacific, and more than once, to advertise his works. But he only travelled about unwholesome London slums, and cannot be judged by the same high ethical standard as the doctor who dispenses advice and a bottle of medicine for sixpence in Whitechapel ; or the veterinary surgeon whose only fee for driving ten miles to see a horse is half the usual mileage charge. Some of us who have bad taste read Mr. Hall Caine's *Christian*, and are not prejudiced against that pretentious failure by the knowledge we can almost daily gain that more novels may be expected from the same author, and what the exact pattern of the next

one selected may be. Sir Henry Irving is at the head of a great profession, and is a knight, not because of his ability, his deportment, and his elocution, but because of his notorious modesty and self-effacement.

Gentlemen, what is zeal in the officer is rank blasphemy in the private. The swindler who robs banks and breaks up hearts and homes is an unfortunate financier, but the man who steals a loaf when starving goes to jail. Pecksniff, V.S.. who has acquired a competency because members of the profession were scarce and people could get no one else, who now, through means known to that oily gentleman, rubs skirts with wealthy clients, from the cushioned ease of Red Lion Square denounces advertising as illegal, immoral, and derogatory to professional dignity, while I cannot paste my name on a wall in Ballinasloe, to indicate to those who wish to employ me where I may be found, without losing caste with superior people. I submit that the insertion of an advertisement in a newspaper or newspapers circulating in the district to which a newly-qualified veterinary surgeon comes is at least absolutely necessary. I fail to see anything but what is manly and straightforward in such a course. I think it is as consonant with dignity as any other course which can be adopted, and much more commendable than many. Of course, I do not ask you to follow the example of the Fellow of the Royal College, who appends to a notice of his professional qualification an intimation that he is the local agent for somebody's ale. Having inserted a modest advertisement in his local paper, or any paper which he thinks will bring the fact of his existence under the notice of those to whom he looks for employment, the newly-qualified man commences practice, and then finds himself confronted very frequently with difficult ethical points, when his sense of honour is brought into conflict with what seems his material interests.

Is he to pay his employers' grooms a percentage on his fees in order to secure their recommendation, and their co-operation in conveying out his instructions for treatment? From what I can gather from the veterinary periodicals and from veterinary surgeons in Ireland, I do not think this custom has obtained much footing here. There is nothing I despise so much myself as "pretentiousness" or "side." The man who puts on airs is generally an ass. But in the veterinary profession, as in every other, it is fatal to err on the other side, and the veterinary surgeon who lowers himself beneath the level of a servant damns all hope of elevation and advancement. What is the veterinary surgeon to do when consulted by one man about a horse which he has or has had under treatment for another? I have had on several occasions to examine horses which were at the time quite sound, but I knew, from knowledge acquired when they were under my treatment, that they would not or might not continue sound. I think the duty of the veterinary surgeon under such circumstances is to obtain permission from the owner of the horse to state the particulars of the ailment for which the horse has been under, and if that permission is not given, to refuse to examine the animal.

What is the ethical code to govern the conduct of the man who, now advanced to reputation and a large practice, is called into consultation by a brother practitioner. Men who live in cities will, I think, find it hard to realise how hard it is for the isolated country practitioner to bear the responsibility of a series of consultations. Helping literature is, unfortunately, scarce. In instance after instance he is confronted with perfectly new aspects of accident and disease. It is on him that the abuse of the confidence of consultation tells. The duty of a consultant is, I think, to hear all details as to symptoms and treatment from his brother practitioner; make his examination, without indicating in too marked a way that his said brother is an ass, and having talked over diagnosis and alterations as to future treatment, the two veterinary surgeons, if called upon, may then interview the owner together.

I have stated above that we are not concerned with the qualifications or abilities of those who purpose joining our profession during a discussion as to the abstract question; but I would be false to my nationality if I did not say that we are concerned as to their sex.

Man's treatment of woman is one of the most absorbing and difficult ethical questions of to-day, as it has been for all time. I cannot leave the question of veterinary ethics without adverting to the discussion which has arisen within our ranks as to the admission of women to the veterinary profession. George Meredith is the only novelist that I know of whom women admit knows their sex. I never knew anyone else who knew them. But I think we can all admit this knowledge, that, though the difficulties may seem insuperable, lovely women always "get there in the end." Women will of course be admitted to the veterinary profession. If there is a majority of misogynous old bachelors and hen-pecked husbands on the Council, their admission may be delayed, but it will come. Why any woman who loves a horse or a dog—or, as so many of them do, all dumb things—will not be allowed to acquire a knowledge of their diseases is a thing I cannot understand. Nor can I comprehend the mental attitude of those who insist that there is no work for a woman veterinary surgeon except castration and obstetrics.

Very often it occurs to me that we veterinarians in the course of years grow, perhaps unconsciously, callous to pain; that we are not always perhaps as sensitive to pain as we might be. It is certainly hard to preserve all our fine and tender feelings when struggling for hours with nervous and perhaps vicious horses; and I would ask why we do not use anæsthetics more extensively in the many painful operations we are called upon to perform. Almost all our operations entail great pain and suffering to our patients; they mean serious risk and an almost unbearable strain of anxiety to ourselves. When we use anæsthetics—as we are called upon to use them by all our feelings of humanity and in our daily work as a matter of routine; then, I think, there will many phases of veterinary work fitted in every way for women, and I submit to my Irish audience that their influence in our profession—as it has always been everywhere—will be to foster a tenderness and sensitive regard for our patients. There are many more points I would like to touch upon in this paper, but time will not permit of my doing so. The question of the condition under which we accept employment from shows; our treatment by our local authorities, and by the veterinary department in Dublin, and many more. Many of these points may be brought up in the discussion which is to follow. I have made no attempt to introduce abstract notes cribbed from Bain and Jevons. I only introduce a subject which will give us a chance of clearing the air, and seeing exactly where we stand. We can then see whether we really want a society at all, whether we are not better each for himself; or together for the furtherance of our common interests, for mutual protection, assistance, and support, and for the elevation of the noble profession to which we belong.

Mr. CLEARY said he partly agreed with Mr. Byrne as to advertising. He thought it a practical thing for a young practitioner, commencing business in a town for the first time, to proclaim his existence by a card in the local paper, but he did not think it nice of him to have his name pasted on every gateway and at fairs, as if he were a sort of premium sire or bull. As to anæsthetics, he believed that with the use of a small quantity of chloroform, this work would be rendered more easy and less dangerous. He had nothing to say except to congratulate Mr. Byrne.

Mr. WINTER said he thought they would all agree that Mr. Byrne's paper was an excellent one. As to advertising, he was an offender in that respect—if it is an offence—but he did not think putting a card in a local paper such.

He believed Mr. Byrne was a great admirer of the ladies, but he thought it was making a mountain out of a mole-hill, as to their being members of the profession. He believed that the use of anæsthetics would take away one hundred per cent. of the personal risk of veterinary surgeons where operations were necessary. He would think much of the Show Committee, who would be guilty of the practice mentioned, and he hoped that they would hear many such excellent papers read at their meetings.

Mr. REA said he agreed with Mr. Byrne to some extent. He did not know whether advertising was good or bad, but he did know that veterinary surgeons' bills were posted all over Ballinasloe during the fair. He agreed that they ought to use more anæsthetics. He knew Mr. Byrne had a weakness for the ladies, and the sooner he got one for himself the better.

Mr. HOWARD said if a veterinary surgeon had treated a horse previously, and was obliged to state so in the certificate, it would in many cases injure the seller. As to the use of anæsthetics, in his opinion, half enough was not used, and with reference to the admission of ladies to the profession, he left that question to others.

Mr. WATSON (Dublin) said it looked like gilding refined gold to pour further laudation on the paper, and on the very able manner in which it had been discussed. He thought Mr. Byrne had dealt with the paper in his usual trenchant style, and the essay was excellent. As to anæsthetics, he believed there would be very little difficulty in their use and small fear of giving an overdose, while they greatly facilitate veterinary surgeons in operations. There was a good deal of advertising, but it was the same with almost every other profession. As to the admission of ladies, there were a number of difficulties about it. There would be a number of instances in which ladies couldn't assist or act, and many things to debar them from entering the profession. He had great pleasure in congratulating Mr. Byrne on his paper, and it was an index of what might be expected in the future at other meetings.

PRESIDENT: I have listened with patience and anxiety to Mr. Byrne's paper. It is an excellent essay. As for the ladies, I say keep them out of the profession.

Mr. WINTER: Except as sleeping partners.

Mr. COLL: I have an experience of 20 years as to advertising. This thing was started 16 years ago by a gentleman in the south of Ireland. Others were led into it, and other men had to, and then what are you going to do? I had to do it; the thing is customary. I am not in favour of promiscuous advertising, and would be glad to see it stopped. As to the admission of ladies to the profession, I foresee a great many difficulties. I remember myself being accompanied to a stable to see a horse, by a widow, a hardy one. It was necessary to have an operation, and the lady soon ran away. Fancy, gentlemen, a lady veterinary surgeon called in at the dead of night to attend a horse at a gentleman's residence in the country, with stable boys as her companions; or, worse still, with the gentleman's son as her protector. From the difficulties I see I am against the admission of women.

Mr. WALSHE continued the debate in a humorous criticism, in the course of which he said he did not see why the admission of ladies to the profession should be objected to.

Mr. BYRNE said he begged to thank them all for the favourable, very favourable manner in which his paper had been received. He might mention that he had forgotten the original paper in Athlone, and had to work the present one from memory. After reviewing the different criticisms already given, his experience of anæsthetics was that their administration was very easy, and he gave them on an ordinary piece of flannel, as is done in Germany. He thought there should be more of the spirit of comrades amongst vete-

rinary surgeons. Mr. Coll would be glad to see promiscuous advertising stopped; so would he. Mr. Coll objected to the admission of ladies to the profession because he was accompanied to a stable by a lady—a widow—who ran away from there. Well, Mr. Coll appeared to have forgotten the words of Sam Weller, and his advice and warnings to his son, "Sammy, Sammy, beware of the widders." With reference to the picture drawn by Mr. Coll of a lady veterinary surgeon being called to see a horse at the residence of a gentleman in the night, they should remember that in the olden days, "a lady, rich and rare," to use the words of Moore, went from one end of this land to the other, unmolested, and he thought it would be the same if ladies were admitted to the profession. He again begged to thank them very, very sincerely for the very favourable manner in which the paper was received.

Mr. WATSON: Our next meeting will be held in Dublin, some time in January, and I hope on that occasion Mr. Freeman will read a paper for us.

Mr. FREEMAN: I told Mr. Watson I would think over it, but I have not sufficient time at my disposal at the present time to do justice to any paper. Before we conclude, I rise with pleasure to propose a vote of thanks to the essayist (Mr. Byrne) for his valuable paper.

Mr. BOLTON seconded, and the vote was passed unanimously.

Mr. PATRICK called attention to a slight omission in the published list of officers.

Mr CLEARY said there was not the necessary precedent to guide the Association.

Mr. WINTER: The date of our next meeting is to be found at this one.

On the proposition of Mr. COLL, seconded by Mr. WALSHE, the date of the next meeting was arranged for the second Tuesday in January, viz., the 11th, in Dublin

Mr. CLEARY: What is the number of members on the roll?

Mr. WATSON (Secretary): About 40.

Mr. COLL: There is a limited amount of opinion as to surgeons not acting at horse shows in the towns in which they reside, and I don't see any objection to a man acting at a show held in the town in which he resides.

Mr. WINTER said he was the gentleman alluded to, and the reason he refused to act was that he happened to be a member of the show committee. He refused to act on these grounds only.

PRESIDENT: I think that alters the case.

Mr. WATSON: It should be the profession first.

Mr. BYRNE said the only objection he had was that he might turn some friends of his clients against him by having to give, perhaps, an adverse opinion.

Mr. CONCANNON said that in such cases he never considered the opinion of anyone, he examined the horse and not the man. He considered it a great shame for veterinary surgeons to have to attend at horse shows without being paid.

Mr. CLEARY said the rate of remuneration he and Mr. Fulton got, he found was 1s. 8½d. per horse at Mullingar.

Mr. CONCANNON: At Galway I got nothing.

The proceedings concluded.

NEW VETERINARY COLLEGE, LEITH WALK, EDINBURGH.

THE Session 1897–98 commenced on Wednesday, the 6th October. In the unavoidable absence of Mr. Jas. Hope, East Barns, Mr. Geo. Whitehead, President of the Yorkshire Veterinary Medical Society, was voted to the Chair. There was a large attendance of both friends to the College and students of

the College. Among the many present were:—Messrs. J. Armstrong, F.R.C.V.S., Penrith; W. Anderson, M.R.C.V.S., Keith; J. Aitken, M.R.C.V.S.; Dalkeith; J. Aitken, M.R.C.V.S., Edinburgh; E. W. Anderton, M.R.C.V.S., Maybole; T. Bowhill, F.R.C.V.S., Edinburgh; A. Boyd, F.R.C.V.S., Melrose; G. W. Balfour, M.R.C.V.S., Dunbar; R. J. Baillie, M.R.C.V.S., Coupar; John Borthwick, M.R.C.V.S., Kirkliston; W. Brownlie, M.R.C.V.S., Coatbridge; J. R. Brown, M.R.C.V.S., West Calder; J. Clarke, F.R.C.V.S., Coupar Angus; T. Campbell, F.R.C.V.S., Kirkcudbright; W. D. Connochie, M.R.C.V.S., Selkirk; G. Craik, M.R.C.V.S., Alnwick; W. Dotchin, M.R.C.V.S., Newcastle; W. Donaldson, M.R.C.V.S., Bridge of Allan; G. Elphick, M.R.C.V.S., Newcastle; J. Hutton, F.R.C.V.S., Kelso; G. Henderson, M.R.C.V.S., Edinburgh; W. Hepburn, M.R.C.V.S., Coldstream; J. W. Ingram, M.R.C.V.S., Manchester; A. W. Lawson, M.R.C.V.S., Falkirk; A. Munro, M.R.C.V.S.; P. Moir, M.R.C.V.S., and A. M. Munro, M.R.C.V.S., Edinburgh; J. McPhail, M.R.C.V.S., Dundee; Captain Pringle, A.V.D., Scots Greys; R. Rutherford, F.R.C.V.S., Edinburgh; A. Reid, M.R.C.V.S., Auchtermuchty; J. Storie, M.R.C.V.S., East Linton; J. Thomson, M.R.C.V.S., and G. A. Thompson, M.R.C.V.S., Aberdeen; G. Whitehead, M.R.C.V.S., Batley; J. Young, M.R.C.V.S., East Calder; Professor J. Mc Lauchlan Young, Aberdeen University; Captain R. Steuart, of Westwood; Professor R. Wallace, Edinburgh University; R. Croall, Esq., of Craigcrook Castle; Mr. and Mrs. Kerr, Jamaica; J. A. Ker, Esq.; Major H. H. Christian, J.P., Portobello; Councillor W. Mitchell-Thomson; Councillor Hunter; T. M. Skirving, Esq., Niddrie Mains; J. Dobie, Esq., Campend: J. Gray, Esq., and J. Johnston, Esq., Portobello; Captain Usmar, Leith Fort; J. Laudells, Esq., "Scotsman"; A. Ogilvy, Esq., and Dr. T. Williams, Edinburgh; W. Elder, Esq., Wokingham; Mrs. Williams; Mrs. Salmond, Bradford; Mrs. W. O. Williams, and Mrs. and Miss Walker, Portobello; Mrs. Davis, Mrs. Johnston, Mrs. Henderson, and Mr. and Misses Usmar, Edinburgh; Mrs. T. M. Skirving, Niddrie Mains; Mrs. Rutherford, Edinburgh; Mrs. Clarke, Coupar Angus; and Mrs. Owen, Bontnewydd.

Mr. WHITEHEAD, in taking the chair, said: I have to thank Principal Williams for the great and unexpected honour which has been conferred on me. Nothing could give me greater pleasure than to assist my old friend and teacher, and I feel proud to think that I am now president of the Yorkshire Veterinary Society, and that one of its founders was your worthy Principal. I have before me a circular issued in 1863 calling together the members of the profession to form a society, and I regret to say that only two remain, viz., the Principal and Mr. Carter, of Bradford.

This is my first visit to Edinburgh since passing my final examination in 1880, and I can assure you that it will not be my last.

I had no idea that this college, built since I left Edinburgh, could have been so splendidly arranged and equipped. In my time we had few of the facilities which the student of to-day has, and yet some of the best men in the profession passed from this institution when its locus was in old Gayfield House, and no wonder good men were turned out when they had such a teacher as Principal Williams.

To you, sir (addressing Principal Williams), I wish continued success. I should like to say, without flattery, that I see little or no change in you, though it is 17 years since last we met in Edinburgh.

Professor BRADLEY then announced that the presentation to which Principal Williams had referred in his address was from the Edinburgh Yorkshire Association, and consisted in the sum of £10, to be awarded in two prizes to the Yorkshire students attending the New Veterinary College; this sum would be divided into two prizes—viz. (1) a gold medal or £5 in money to the student who passes the best First Professional Examination in

May, 1898; (2) a gold medal or £5 in money to the student who passes the best Second Professional Examination in May, 1898.

Intimation was also made of a further presentation by Mr. Ashton, of Bolton, of three medals for the best Practical Examination.

THE CENTRAL VETERINARY MEDICAL SOCIETY.

THE annual general meeting was held on Thursday night the 7th instant, at the Royal College of Veterinary Surgeons, 10, Red Lion Square, Bloomsbury, Vet.-Lieut.-Col. J. Kettle, the president, occupying the chair. The fellows and visitors present were: Messrs. W. F. Barrett, J. Baxter, Geo. Hall Brown, J. K. Bruce, A. L. Butters, J. A. W. Dollar, F. Hobday, F. W. Kendall, F. C. Mahon (hon. sec.), J. Macqueen, W. J. Mulvey, J. A. Nunn, A.V.D.; J Penberthy, A. Prudames, R. Porch, W. Reekie, H. G. Rogers, J. Rowe (hon. treas.), W. E. Taylor, T. Tooth, S. Villar; and as visitors: Messrs. Morgan-Evans, W. H. Flook, and W. Rogers Clark.

The minutes of the preceding annual meeting were read by the HONORARY SECRETARY (Mr. F. C. Mahon) and were confirmed.

Communications were read by Mr. Mahon from the following members of the Society expressive of regret at their inability to attend:—Messrs. J. S. Hurndall, J. W. Barker, T. C. Garry, H. Edgar, A. Wheatley, and Professor F. Hobday.

The Council's Report and Balance Sheet.

On the motion of Mr. W. Reekie, seconded by Mr. H. G. Rogers, the report of the Council for the past year was adopted. The report was as follows:—

During the session 1896-7 fourteen new fellows joined the Society. At the present time the Society numbers 150 members.

During the session six Council and nine ordinary general meetings have been held. The average attendance has been forty-two.

Papers and addresses have been delivered as follows:

1. Presidential Address, by Veterinary-Lieutenant-Colonel J. Kettle, A.V.D.
2. An address on "Indian Hemp," the work of Veterinary-Captain C. Rutherford, A.V.D., Umballa, India, and read to the meeting by Professor J. Macqueen.
3. "Some Notes on the Operation of Castration," by Veterinary-Major J. A. Nunn, D.S.O., C.S.I., A.V.D.
4. Introduction and discussion on Veterinary-Captain J. A. Haslam's, F.R.C.V.S., A.V.D., "A Sterilisable Veterinary Hypodermic Syringe."
5. "Suppurative Lymphangitis," by Veterinary-Lieutenant J. Moore, F.R.C.V.S., A.V.D.
6. "Lameness Arising from Affections in the Regions of the Shoulder and Hip-joints, by Professor Pritchard, F.C.S.
7. "Capped Elbow in the Horse," by Mr. A. L. Butters, M.R.C.V.S.
8. "The Suppression of Rabies," by Mr. W. Hunting, F.R.C.V.S.
9. "The Control of Tuberculosis among animals," by Mr. Harold Sessions, F.R.C.V.S., of Brighton.

Various interesting specimens were exhibited at the meetings, and we were especially fortunate in being honoured by a visit from Professor Cossar Ewart, M.D., F.R.S., who gave an exhibition of horse embryos, and of photographs of zebras and zebra-hybrids, which were of singular import.

The Public Health (Scotland) Bill received due attention at our hands, a council meeting being held to discuss its salient features, to us as veterinarians; a resolution being passed which seemingly has been productive of much good.

The question of a Veterinary Benevolent Fund, proposed by Professor MACQUEEN, F.R.C.V.S., and seconded by Professor PENBERTHY, was raised,

a committee formed, a scheme duly drawn up, the result being communicated to the various veterinary medical societies throughout the United Kingdom, and elsewhere.

The receipts during the session have been £87 13s. 6d. and the expenditure £110 12s. 5d. The Society has purchased £112 worth of consols during the past year.

F. C. MAHON, *Hon. Sec.*

The CHAIRMAN explained that on the agenda for that meeting the reception of the report and balance sheet of the Council, appeared among the business to be transacted, but he had struck out the words "and balance sheet" because he had carefully examined the rules of the Society, and failed to find in any of them that it was necessary that the balance sheet should be submitted for the approval or criticism of that meeting at all. The balance-sheet, so far as the rules went, seemed to be the sole concern of the Council. Acting upon precedent, however, he had had the balance sheet printed, and it was now laid upon the table. He was sure that the treasurer or any other official concerned would be ready to answer any question as to the financial statement that might be put to them,

Mr. ROGERS, speaking from memory, said his belief was that, though the rules of the Society might not require the balance sheet to be confirmed by the annual general meeting, the agenda for that meeting since the formation of the Society had always had this entry "to receive the annual report and balance sheet."

Mr. BARRETT said the only thing he wished to say in reference to the balance sheet was that the members of the Society should know that there had been a loss incurred on the year's working, and that it was desirable that in future fellows should pay their subscriptions when they were due.

Mr. REEKIE said it seemed that all the meeting could do was to agree to the balance sheet without criticising its items. Some of those items he thought, might be reduced with advantage to the Society.

Mr. J. A. W. DOLLAR, speaking as a member of Council, said he was sure it was the desire of the President and of the other members of the Council that the fellows generally should be made fully acquainted with the financial position of the Society. As there appeared, however, to be a certain authority for the view expressed by the President that it was not incumbent upon the Council to submit the annual balance-sheet under the present state of the rules, he (Mr. Dollar) gave notice of his intention to move at the next annual meeting an alteration of the rules which would require this to be done. He did so because he could not help feeling that finance was one of the most important concerns affecting a society like that, and that for the welfare of the Society they could not have too much publicity in such a matter. If, therefore, they were merely then in the position of discussing the balance-sheet by courtesy, he thought they might make up their minds that that would be the last occasion when this limitation of power would obtain; and that in future the balance-sheet would be submitted as a matter of rule.

Mr. PRUDAMES said that during his presidential year he suggested that the balance-sheet should be annually printed and made public. Until then, he thought he was right in saying no balance-sheet had been disseminated, and his suggestion—which was adopted—was with a view that their accounts should be thoroughly open to every member for consideration and discussion. He was not aware until a few minutes ago that the rnles were as the President had shown them to be, and Colonel Kettle was, no doubt, acting strictly according to the rules that governed them in the conduct of that Society. Hitherto when the balance-sheet was printed and laid upon the table it had been customary to discuss it; and, if an alteration of rules was necessary to admit of this being legally done, as they were assured was the fact, he should

be prepared to second Mr. Dollar's motion when it came before the next annual meeting.

Mr. DOLLAR: Will the Society pardon my again rising, in order to say that I think, the President has done us a service in bringing forward this question, and I feel sure that it is with the object of having the omission supplied that he has done so. It is so serious a matter that really it is not one which ought to be allowed to drift on in the old state of affairs for any length of time. I think it was with the object of having the omission rectified that he has shown us clearly what the rules are.

The CHAIRMAN said Mr. Dollar had correctly described his purpose. They were bound to act according to the rules of the Society until they were altered Rule 40 laid down the business to be transacted at the annual general meeting, and there was no reference here to the balance sheet. He contended that there should be. Mr. Prudames had instituted the rule to voluntarily place the balance sheet on the table, for the information of members and this rule he (the Chairman) had followed. Colonel Kettle read other rules in which there was no reference to the submission of the balance sheet to the annual meeting.

Mr. REEKIE: Then according to the rules, it is *ultra vires* on our part to discuss the balance sheet at all.

Professor PENBERTHY said that although they might not discuss the items as they appeared in the balance sheet, yet surely it was competent for them to have discussed how the balance mentioned in the report (which was before the general meeting for adoption and had been adopted) was arrived at.

Mr. BARRETT thought that the meeting would be in order in discussing the balance sheet, inasmuch as they were roughly told in the report what the financial result of the year's working had been.

Professor PENBERTHY said he thought they had the power to discuss the balance sheet because of the reference to finance in the Council's report; but inasmuch as they had already adopted the report, the discussion was no longer in order.

Mr. BARRETT: My remarks were based on the supposition that the report had not been adopted.

Mr. REEKIE: When I moved the adoption of the annual report I did so on the understanding that the report was distinct from the balance-sheet. I asked that question first of all.

The CHAIRMAN: And I replied that I had struck out the words after annual report "and the balance-sheet."

Mr. DOLLAR thought the meeting could not have discussed the balance-sheet upon a mere bald statement contained in the report that the receipts had been so much and the expenditure so much.

The discussion then dropped.

Election of Officers.

Messrs. Reekie and Baxter were appointed scrutineers in connection with the ballots for election of officers.

The CHAIRMAN: I am not quite sure whether, as president, I have power to propose a member as president. I do not wish to depart from any recognised rule or custom. I do not know whether there is anything against my doing so.

Mr. BARRETT: No, I think not, sir.

The CHAIRMAN: Then it will afford me great pleasure to propose a gentleman to succeed me. I do not intend to say much about that gentlemen at the present moment. I will do so later. I think he will fill this position worthily and, therefore, I propose Mr. J. A. W. Dollar.

Mr. BUTTERS: I have much pleasure in seconding the motion.

The CHAIRMAN: If no other gentleman has anyone to propose, I will put the motion.

The proposition was then put and passed unanimously.

Mr. Dollar was then declared unanimously elected as president for the ensuing year.

After various gentlemen nominated declining to stand, including the president, the following four Fellows were chosen vice-presidents unanimously and without recourse to a ballot: Messrs. A. L. Butters, W. E. Taylor, S. Villar, and W. Perryman.

Twelve gentlemen had next to be elected to constitute (with the officers) the Council of the Society; there were fifteen nominations, and a ballot resulted in the election of the following Fellows: Vet.-Col. Kettle, Vet.-Capt. J. A. Nunn, Professors Penberthy, F.R.C.V.S., Macqueen and Hobday; Messrs. R. Porch, W. F. Barrett, Wm. Hunting, H. Edgar, W. J. Mulvey, A. Prudames, and W. Reekie.

The CHAIRMAN: Our next business is to elect an honorary treasurer.

MR. BARRETT: I have great pleasure in proposing the re-election of Mr. Rowe as our honorary treasurer. He has acted in that capacity for many years, and has afforded us, I think I may say, complete satisfaction.

Mr. REEKIE, in seconding the motion, remarked that no better man for the office of treasurership could be chosen than Mr. Rowe.

The CHAIRMAN said that, personally, he felt obliged to Mr. Rowe for the very able and satisfactory manner in which he had performed the duties of treasurer during the past year.

The motion was carried *nem. con.*

Mr. DOLLAR: I beg to propose that Mr. Mahon be re-elected honorary secretary for the ensuing year. I feel sure that every one who comes in contact with Mr. Mahon knows how very efficiently and punctiliously he carries out his duties. I feel sure we could not have anyone who would give us greater satisfaction than Mr. Mahon.

Mr. PRUDAMES: I have very much pleasure in seconding the motion. I am sure we could not possibly have a better Secretary than Mr. Mahon, one more indefatigable, or one who would carry out the duties of the office with more advantage to the Society.

The CHAIRMAN said that personally he was extremely thankful to Mr. Mahon for his services.

The motion was passed *nem. con.*

The HON. SEC.: I thank you very much for the honour you have again unanimously bestowed upon me.

Mr. BUTTERS and Mr. GARRY were then unanimously re-elected auditors.

Nominations.

The following members of the Royal College of Veterinary Surgeons were duly nominated for election as Fellows of the Society: Vet.-Captain R. Moore, A.V.D., Aldershot; Mr. J. Webb, Bishop's Stortford; Mr. F. E. Place, Hampstead; Mr. S. H. Skelton, Forest Gate, E.; and Vet.-Capt. Meredith, A.V.D., Aldershot.

Votes of Thanks.

The retiring President, in vacating the chair and thanking the members of the Society for the manner in which they had supported him, mentioned some matters that were yet in an indeterminate stage, which he passed on to his successor. He also thanked the Society for having elected as honorary members several of his brother officers of the Army Veterinary Department, who had been called away on foreign service.

Mr. J. A. W. DOLLAR then took the chair and said: It is not my intention

to address you at any great length in acknowledgment of the very great honour you have done me. I beg you to believe that I feel alike the honour and the responsibility. Doubly so do I feel the honour and responsibility, considering how very successful the Society has been under its late president, and what great advances the past year has marked. When my name was proposed for the office of president, I may say the only consideration which led me to accept the honour was the feeling which I have long held very strongly, that this was a Society conducive to the good of, and calculated to encourage the young men of, the veterinary profession. I may go further, and say that this appears to me to be the premier society of all the societies of Great Britain. It is essentially a society of young men, for even those whose heads would appear to indicate their advance beyond the stage at which they can still boast their first youth are yet all young in spirit; and I believe they all sympathise with the aspirations and duties of the young and enthusiastic members amongst us. I shall not detain you further, save to assure you that it will be my effort, as it will be my pleasure, to do anything that I can to advance the interests of the Society; and that during the year of my office I shall endeavour at least to see that the standard of prosperity ensured under our late president, certainly does not suffer any diminution. Gentlemen, I thank you. I believe there is one duty devolving upon the newly-elected president, and one especially pleasing to me, namely, to propose a very hearty vote of thanks to the retiring president for his services and for the great efforts he has made in the past year. I feel sure that in the present instance you will pass that vote of thanks with special fervour. I may say that from my own experience of the manner in which the duties of the presidential chair have been performed during the past year, the passing of a special and enthusiastic vote of thanks will be a matter of personal gratification to myself. I beg to propose a very hearty vote of thanks to Colonel Kettle for his services in the chair, and for the services he has rendered the Society during his year of office.

Mr. BARRETT, in seconding the motion, cordially acquiesced in the remarks of Mr. Dollar. He felt that the late president had done everything in his power to aid the society. He had introduced many new members, and had been instrumental in enabling the Society to enjoy the several interesting and scientific papers.

The motion was passed by acclamation.

Colonel KETTLE: Gentlemen, I will not detain you by making any lengthened remarks. I simply tell you that I thoroughly and sincerely thank you for all your indulgent kindness and support during my year of office.

Mr. BARRETT then proposed a vote of thanks to the honorary treasurer and the honorary secretary for their able and valuable services during the past year.

Colonel KETTLE seconded the motion.

The CHAIRMAN: I must really apologise to our Treasurer and Secretary for having overlooked their just claims to our very hearty thanks. I am sure you will excuse me considering the very peculiar position in which I stand.

The motion was adopted unanimously.

Mr. ROWE, the honorary treasurer, said he would endeavour in the future, as he had done in the past, to give satisfaction. He asked them not to go away with the erroneous impression that the Society was going backwards. Far from it. They had made a departure in the past year of which he might speak later on at the dinner to be held in the following month; and meanwhile he reminded members that the hospitalities now practised by the Society had resulted in a largely increased expenditure. He once more appealed to members to do him the favour of voluntarily and readily paying their subscriptions when they fell due.

Mr. MAHON, the hon. secretary, said: I have in a very few words simply to thank you for the great honour yon have again conferred upon me by re-electing me the honorary Secretary of this Society. As in the past, so in the future I hope to do my duty towards the Society, and I sincerely trust my small efforts will continue to meet with your approbation.

The proceedings then terminated.

CONTAGIOUS DISEASES ANIMALS ACT, 1894 and 1896.

SUMMARY OF RETURNS OF OUTBREAKS, for the four weeks ending September 25th, 1897.

ENGLAND AND WALES.

Pleuro-Pneumonia.	Swine Fever.	Glanders. (including Farcy).	Rabies.	Anthrax.	Sheep-Scab (for month of August.)
None	Outbreaks 89 Slaughtered 2,778	Outbreaks 80 Attacked 149	Dogs 11 Other animals 0 Destroyed 7	Outbreaks 24 Attacked 30	Outbreaks 15

SCOTLAND.

None	Outbreaks 5 Slaughtered 177	Outbreaks 1 Attacked 3	None	Outbreaks 6 Attacked 6	Outbreaks 1

IRELAND.

Sept. 4	None	Outbreaks 7 Slaughtered 21	None	Dogs 13 Other animals 2 Destroyed 45	None	
Sep. 11	None	Outbreaks 3 Slaughtered 43	None	Dogs 4 Other animals 2 Destroyed 7	None	
Sept 18	No return	No return	No return	No return	No return	
Sep. 25	None	Outbreaks 3 Slaughtered 40	None	Dogs 4 Other animals 1 Destroyed 27	None	

SUMMARY OF RETURNS OF OUTBREAKS, for the four weeks ending October 23rd, 1897.

ENGLAND AND WALES.

Pleuro-Pneumonia.	Swine Fever.	Glanders (including Farcy).	Rabies.	Anthrax.	Sheep-Scab (for month of September.)
Outbreaks 1 Found diseased 3 Slaughtered 23	Outbreaks 80 Slaughtered 1,146	Outbreaks 74 Attacked 112	Dogs 7 Other animals 0 Destroyed 71	Outbreaks 22 Attacked 49	Outbreaks 42

SCOTLAND.

None	Outbreaks 4 Slaughtered 45	Outbreaks 5 Attacked 11	None	Outbreaks 6 Attacks 7	Outbreaks 3

IRELAND.

Oct. 2	No return	No return	No return	No return	No return	
Oct. 9	None	Outbreaks 3 Slaughtered 85	None	Dogs 2 Other animals 2 Destroyed 4	None	
Oct. 16	None	Outbreaks 3 Slaughtered 74	None	Dogs 1 Other animals 3 Destroyed 10	None	
Oct. 23	No return	No return	No return	No return	No return	

AN ADDRESS ON ACQUIRED IMMUNITY.

BY G. ARCHDALL REID, M.B.EDIN.

(*Continued from page* 314.)

Now, we saw when considering Pasteur's experiments that powers of resistance against virulent toxins and the micro-organisms producing them, *i.e.*, against the disease, are much more readily attained by a series of efforts than by a single effort; in other words, immunity is much more readily achieved if the cells concerned have presented to them the toxins in a graduated scale, beginning with toxins of a low degree of virulence, and ending with those of a high degree of virulence, in this resembling other kinds of cells when concerned with other deleterious influences, for instance, the cells concerned when nicotine is taken into the system, which are able, through habituation, to tolerate without injury enormously increased doses. But while there is this general resemblance in the reactions induced by graduated toxins and graduated deleterious influences of other kinds there is a very important difference, viz., that in the presence of large doses of nicotine, arsenic, opium, etc., smaller doses add to the effect of the larger, whereas in the presence of virulent toxins, less virulent toxins do not add to the effect of the former, but, on the contrary, often induce a protective reaction against them. This, for example, we find is the case when attenuated injections from a series of drying infected cords are made into an animal suffering from rabies, in which disease there is present a microbe that produces toxins of such extreme virulence that normally no reaction is possible against them any more than against fatal doses of arsenic, opium, etc., so that the infected animal invariably perishes except the protective injections be made. The explanation of this remarkable phenomena is probably to be found in the fact that while larger and smaller doses of arsenic, opium, nicotine, etc., are but degrees of the same thing—are but the same thing in different amounts and degrees of concentration—stronger and weaker toxins are not the same thing in different amounts and degrees of concentration, but strong toxins differ somewhat in kind from the weak toxins of the same disease, are probably of a somewhat different chemical constitution, and therefore while moderate heat, friction, fatigue, or doses of nicotine, etc., in the presence of greater heat, friction, fatigue, or doses of nicotene, etc., cannot inure the cells concerned to the action of the latter, the weaker toxin can sometimes, even in the presence of the stronger when these are not too concentrated, inure the cells concerned to the action of the latter, as in the case just cited of an individual already infected with rabies when attenuated toxins are introduced from a slowly drying cord in an early stage of the disease. At a later stage, when the strong toxins are more concentrated, it is useless to inject the weaker, for the poisoned cells are then unable to react and the animal perishes. This view is confirmed by a study of other diseases. In diphtheria for instance, the pathogenic micro-organisms are limited to a small area of the surface; the toxins are, therefore, in the earlier stages at least, very dilute in the blood, and as a consequence it is often possible to introduce attenuated toxins with advantage, whereas in small-pox, in which the micro-organisms presumably pervade the whole body and the toxins are from an early period concentrated, it is useless to vaccinate after the first symptoms of the disease have appeared.

Apparently, then, acquired immunity consists essentially of an acquired power of tolerance, by virtue of which the cells concerned are able to perform their functions in spite of the presence of toxins. In the case of the cells specially concerned in zymotic diseases—i.e., those concerned in the destruction and removal of the pathogenic micro-organisms and their

toxins—this acquired power enables them the more readily to produce the two or more digestive bodies inimical to the ferments and their toxins. But if an animal which has not acquired immunity (in the case of diseases against which permanent immunity may be acquired), or which has lapsed its acquired immunity (in the case of diseases against which permanent immunity cannot be acquired), be infected, then the cells concerned being poisoned may not react at all—i.e., may fail to produce their digestive bodies, when the proliferation of the invading microbes and the elaboration of their toxins will continue unchecked, and the animal will perish; on the other hand, in an animal which has not acquired immunity or which has lapsed its immunity, the inborn powers of resistance of the cells may be, and is, as regards most animals in relation to most diseases, so great that they are able to produce the digestive bodies to some extent from the first in spite of the presence of the toxins, and therefore most animals are capable of recovering from most of the diseases to which they are liable. Digestion—i.e., attenuation—of the toxins then occurs, till in time there are present in the animal's blood toxins in all stages of digestion, from virulent toxins newly produced, and hardly affected by the enzymes, to toxins long produced, and so enfeebled as scarcely to deserve the name; and, as reasoning by analogy we may suppose, *up that graduated scale it is probable the cells of the animal react till complete immunity is attained*, just as the cells of an animal affected by rabies and anthrax react when treated to the less finely graduated toxins provided by Pasteur's treatment.

Moreover, if the blood serum of such an animal be removed and injected into a susceptible subject, either one not yet infected, or, if infected, one the cells of which are not poisoned beyond the power of reaction. this second animal also will thereby be provided with a means of achieving immunity. If he be not infected the altered toxins will provide him with a scale of graduated poisons up which his cells may react towards complete immunity, the completeness of the immunity acquired by him being proportionate to the virulence of the toxins at the more poisonous or least digested end of the scale. If he be already infected, not only will the injection provide him with a scale of graduated toxins, but it will also provide him with digestive bodies wherewith to attenuate the toxins which are then being elaborated by the micro-organisms infecting him. But of course the blood serum of an animal which has been infected and is recovering from the disease will be infinitely inferior in curative and immunising power to the serum of an animal into which the large quantities of toxin (elaborated in an artificial medium) have been injected in oft-repeated doses extending over a length of time, since in the latter case the quantity of attenuated toxins and digestive bodies will naturally be much greater than in the former. It further follows that, if we mix toxins with fresh antitoxic serum *in vitro* at a suitable temperature and for a sufficient length of time, the digestive bodies present in the latter will attenuate the former, and, therefore, that much larger doses of toxin can be administered without death in this way to a susceptible animal than in any other. Professor Fraser contends that, since antitoxic serum when mixed with toxins *in vitro* "neutralises" the latter more effectually after twenty minutes' contact than after contact of five minutes, proof is thereby supplied or a probability raised that such a neutralisation is a chemical one in the sense meant when we say that an acid is neutralised by a base; but surely when we remember the comparative rapidity of chemical and the comparative slowness of physiological reaction, the probability is that we have here to deal with a digestive process rather than a mere chemical combination, a probability immensely strengthened by the consideration already dwelt upon that it is hardly likely that the animal body is a magic bottle producing at need the right toxins on the right occasion.

Various other considerations lend strength to the belief that acquired immunity against any disease depends essentially on a gradual habituation to its toxins, or an increased power of physiological resistance, as a result of which, cells are enabled to perform their functions in spite of the presence of the toxins (which, indeed, do then but stimulate the cells specially concerned, *i.e.*, those which produce the digestive bodies), not on the production of chemically antagonistic substances; and, further, that the persistence of immunity depends on the persistence of this power, not on the continued persistence within the system of antidotal substances, whether chemical (in the narrow sense) or digestive. For instance, it was found by Roux and Vailliard that, if too large or too frequent doses of tetanus toxin are injected into the horse, the antitoxic powers of the serum disappear for a time, and the serum actually becomes toxic; yet the horse manifests no symptoms of tetanus, as it would did immunity depend on the production of chemically antagonistic substances, and not on a habituation to the poison. In this case it is evident that the cells of the horse are unable to produce digestive bodies fast enough to quickly attenuate the excessive quantity of toxin. Again, it was found by Buchner that a mixture of toxin and antitoxin—*e.g.*, that of tetanus—in a proportion harmless to an animal of one susceptible species—*e.g.*, a mouse—is still toxic to a weaker animal of the same species or to an animal of a more susceptible species—*e.g.*, a guinea-pig—which could not be the case did the antitoxin contain substances which neutralised the toxin; whereas, if immunity depends immediately on a physiological, not on a chemical, reaction, even an attenuated toxin may be fatal to a very susceptible animal; an inference corroborated by the fact that a non-susceptible animal may be rendered susceptible by influences—*e.g.*, cold or starvation—which lower the vitality.

But, perhaps, the most beautiful and convincing proof is supplied by the study of syphilis, a disease against which immunity may be acquired, but which, owing to the feebleness of the toxins (in this approaching tuberculosis and leprosy), yet persists long enough in a woman to cover the entire period of pregnancy. Normally, as we know, there is no connection between the placental blood-vessels of a mother and those of her fœtus. But they are in close apposition, and are very thin-walled, so that while solids (*e.g.*, the microbes of disease) are normally stopped, fluids with gases and solids (*e.g.*, toxins) in solutions pass from one to the other by diffusion. Under abnormal circumstances (*e.g.*, during disease) the continuity of the vessel-walls may be broken, and then solids as well as fluids pass from one to the other. It can hardly be doubted that this is what commonly happens in syphilis, and, therefore, a syphilitic mother very generally bears a syphilitic child. But when in rare cases the continuity of the vessel-walls is not broken, when a syphilitic mother bears a healthy child, or when, as more commonly happens, the healthy partner of a syphilitic father is delivered of an infected child, then is seen a most instructive phenomenon—the healthy individual is seen to be immune to the disease, for such an infant does not acquire the disease when suckled by his infected mother, nor, on the other hand, as Colles proved, does a healthy mother contract the disease when suckling her infected child, though other women do. Here, during gestation, toxins, passing from the infected to the non-infected individual, inure the cells of the latter to resistance, and, as a result, they destroy the pathogenic micro-organisms, if at any future time, in the act of sucking or of giving suck, they find entrance. But the children born of a mother who has recovered from syphilis, and who is immune, are not themselves immune, as are the healthy children born to her during her illness. Whence it follows that her continued immunity is not due to the presence of chemical antidotes or digestive bodies; for if it were, her offspring would

continue to be born immune, just as they did (if uninfected) when she was ill. Her continued immunity is plainly due to the fact that her cells do not lapse the training they received when she was suffering from the disease.

In connection with syphilis, it would be interesting to seek the explanation of some instructive phenomena which often occur in the inherited form of that disease. If a man contracts syphilis, then, after a certain number of years, of which the limit has been set at five, he ceases as a rule to be infective to a woman, but for very long after he may have offspring who exhibit all the signs of very virulent infection. If a woman contracts syphilis, then, like a man, she also ceases after a limited time to be infective to another adult, and not only this, but, unlike the man, she ceases also to be infective to her children (Diday's law of decrease). Speaking only in general terms and without regard to the numerous exceptions, which doubtless depend on differences in resisting power in the offspring, the children earliest born to her after infection suffer in the absence of treatment most severely from the disease, those later born less severely, till at length, if she continue to bear children, the latest born do not suffer at all. Her disease tends at once to result in abortions and miscarriages, then in the birth at term of one or more dead children, then in one or more children who survive their birth for a space, next in children who survive, but show signs of disease, and, lastly, in children who show no signs of infection. If such a woman mate with an infected man this law still holds, for which reason the children of a married couple who have the disease, as a rule, even in the absence of treatment, show less and less signs of it, whereas a woman not previously infected may bear grievously infected children to a father who has long ceased to exhibit signs of the disease. Moreover, if a non-infected mother bear infected children, who live, to a diseased father, her children also show less and less signs of it, until at length they show no signs at all.

If I am right in the foregoing part of this paper, acquired immunity to syphilis, like acquired immunity to other zymotic diseases, must depend on an acquired power of tolerating the toxins, the cells concerned (especially those concerned in the elaboration of the digestive bodies) being able to perform their functions in spite of the presence of the toxins, in consequence of which the micro-organisms must gradually be destroyed, or if some of them survive they must survive in the unfavourable environment in a highly resistant, and, therefore, judging by analogy, a very harmless form, *e.g.*, as resting spores. Now, we have evidence that pathogenic micro-organisms do not induce disease in susceptible animals when the number in which they find entrance sinks below a certain minimum, which minimum, doubtless, varies with the species of the invading microbes, with the species of the animal attacked, and even with each individual of the latter. Thus it has been found that to kill a rabbit by artificial infection at least 16,000 virulent anthrax bacilli must be introduced, a lesser number, if introduced, perishing, and the rabbit acquiring greater resisting powers (Lubarsch). Again, 1 c.c. of a fresh broth culture of bacillus pyocyaneus will infallibly cause fatal disease in a rabbit, which, however, will survive, and acquire increased resisting power from the injection of a quarter of that quantity. But immature animals are less resistant than adult animals of the same species;* for instance, young guinea-pigs succumb more easily to attenuated anthrax bacilli than do older animals. Presumably, therefore, young animals are capable of being infected by a smaller quantity of microbes than adults, and for this reason it probably is that a father may infect his offspring with syphilis at a time when few microbes survive in him, and long after he has ceased to be infective to a woman; and this readier infectibility of the young probably suffices also to explain the fact

* For the biological explanation of this see "The Present Evolution of Man," p. 269.

that while it is rare for a diseased woman to bear a non-infected child, it is much more common for a diseased child to be born of a healthy mother. Moreover, both the ovum and the spermatrzoon are unicellular animals ; in them there is no differentiation of tissue for the performance of different functions ; in them, therefore, are no cells which can react to the toxins, and therefore neither ovum or spermotozoon has the power of resisting the microbes, or in other words of acquiring immunity. This power, like the power of acquiring all other acquirable traits, arises later in their cell-descendants when these latter have undergone morphological and physiological specialisation and differentiation into skin, muscle, gland, nerve, phagocytic and other cells. Hence it follows that a man can never confer immunity on his children, for though his spermatozoa be bathed in toxins they cannot react, since the necessary machinery is wanting. So, also, a woman who has recovered from syphilis or any other disease cannot, then, confer immunity on her non-infected children, for though during her illness her ova are bathed in toxins, yet in them also the machinery for reaction is wanting. But if a woman becomes pregnant during her illness, then in her embryo (that mass of the adherent cell-descendants of her ovum) there are present differentiated and specialised cells, which, like those of her own body, have the power of acquiring various traits, among others that of reacting to the toxins of this or that disease. And, therefore, while a man can never confer immunity on his children, or a woman on children born to her before infection or after recovery, a woman can confer immunity on offspring of which she is pregnant during her illness, for in the latter case the necessary machinery for acquiring immunity is present—*i.e.*, the toxins passing from the mother to the embryo may induce a protective reaction in the cells of the latter, especially in those concerned in the elaboration of the digestive bodies.

But syphilis is a disease of long duration ; in other words, immunity against it is only very slowly acquired—that is, the cells only very slowly acquire the power of tolerating the toxins, and of producing the digestive bodies undeterred by their presence. It follows that if a woman become pregnant during the earlier stages of her illness, even if the microbes be stopped in the placenta, and the child is not affected, there will pass from her to the embryo toxins which are little or not at all attenuated, and therefore since young individuals are in general less capable of resisting zymotic diseases than the older members of their species, the embryo perishes, and the mother aborts or miscarries. But as her disease progresses the mother gradually acquires more resisting power ; her cells become more and more tolerant of the toxins, and, therefore, more and more capable of producing digestive substances which attenuate and destroy the toxins, and, therefore, up to the time of her recovery she becomes more and more capable of conferring immunity on her offspring, since, as time lapses, there pass from her to the child toxins in greater and greater states of attenuation. Then, even if the child be infected, as usually occurs, the digestive substances he receives through the placenta from the mother tend to destroy the micro-organisms and attenuate the toxins produced in him. At length, before recovery and immunity are achieved, a time arrives, the advent of which varies in different individuals, when the digestive substances produced in the infected mother are of such potency or in such abundance that the toxins are so much attenuated as not to destroy the child, who is then born alive, and he may be of a fat and healthy appearance.* In him are

* Be it remembered that here I write in general terms only. As is well known, living children may be born to a woman in all stages of her disease ; but abortions and miscarriages are most frequent during the earlier stages, and of such children as are born alive the vast majority perish. It is very significant, moreover, that hand-fed syphilitic

present digestive substances, attenuated toxins, and the micro-organisms of the disease. Frequently in such a child the disease reasserts itself, the child begins to pine, and ere long perishes. The only feasible explanation of this phenomenon appears to be the following: that the digestive bodies from the mother attenuate the toxins sufficiently to protect the child from injury, but not sufficiently to bring about in the young individual a protective reaction, which is then as impossible to him as a protective reaction to the non-attenuated toxins of rabies is to an adult individual. Therefore, after birth, when the dtgestive bodies derived from the mother are exhausted, the toxins produced by the microbes within the child, and not now altered, cause his death. But in a still later stage in the mother's disease the toxins are so much attenuated that the cells of the child are able to react, and, therefore, though after birth signs of the disease may be seen, he recovers and is afterwards immune. Still later, when the mother has recovered, when her cells have acquired the power of resisting the toxins and she is immune, the child can acquire from her neither the disease nor the immunity, since toxins, attenuated and otherwise, no longer pass from the one to the other.†

On the other hand, if a healthy mother bear diseased children to an infected father we should, if our theory be correct, expect to find (and actually we do find) that each succeeding infant exhibits less and less signs of the disease, and this notwithstanding the fact, other things being equal, that the last child infected by a diseased father tends, when born to a different woman who has not previously suffered from the disease or borne infected children, to have the complaint as deeply as the first ; in other words, a woman who has once borne an infected child tends to endow succeeding infected children with greater and greater powers of resistance, the greater powers of resistance being clearly derived from her and not from the father, since other women who have neither themselves been infected nor have borne infected children may bear deeply diseased children to the same father. Here in the case of the former woman toxins from each infected child pass into the circulation of the non-infected mother, inducing a more and more perfect reaction in each succeeding pregnancy; and therefore in each succeeding pregnancy there are elaborated by her more and more digestive bodies, which at length attenuate the toxins so thoroughly that the cells of the child are able to react and the child survives,

children are more liable than those who are breast-fed to marasmus (Coutts). It is known that "antitoxins" are secreted in the milk and other secretions, and Ehrlich actually believes that the hereditary transmission of acquired immunity is due to the presence of large amounts of antitoxins in the milk.

† I cannot set forth positive evidence proving that the children born of a mother recovered from syphilis and immune to it are not themselves immune, for I am not aware that any observations bearing on the subject have been published. Nevertheless, reasoning from the analogy of other diseases, we may be sure that they are so; for it is a matter of common knowledge that the children of mothers recovered from and immune to pertussis, measles, scarlet fever, small-pox, typhoid fever, typhus fever, etc., are not immune. On the other hand, the children of mothers who during the pregnancy have suffered from small-pox have been found to be immune ; and Chauveau claims to have proved that the offspring of sheep suffering from anthrax have, under similar circumstances, exhibited immunity against that disease. I myself hope soon to publish some observations proving that if a mother be vaccinated during the later months of pregnancy, immunity against varicella, and therefore against variola, is thereby conferred on her infant. If I am right as to this—and I cannot doubt that I am—the matter may be of some practical importance ; since a single vaccination would then protect two individuals, since a strong healthy woman is better fitted to undergo the illness than a delicate young infant, and since many mothers would prefer to take their child's trouble on their own shoulders. The usefulness of such vaccination would, however, be limited, since it would be available in most instances for one pregnancy only, and in many cases not even for that. I should like to add that I would be extremely grateful to any readers if they would, as opportunity offered, perform this experiment and let me know the result.

instead of perishing in intra or extra-uterine life like its predecessors. In this case toxins pass from the child to the mother, while from the mother to the child pass attenuated toxins and digestive substances.

It follows as a corollary that, if a mother who has acquired immunity either by personal disease or by bearing infected children become pregnant of an infected embryo, she will tend to confer immunity on the embryo, since the elaboration of toxins in the latter will tend to call forth the elaboration of digestive bodies in her; but if the embryo be not infected then immunity will not be conferred, for in such a case no toxins from the child will call forth the digestive bodies from the mother, and these, as we have seen, do not persist in the body in the absence of appropriate stimulation—*i.e.*, in the absence of toxins—but after a space disappear, leaving behind only the power of tolerating the toxins, only the power of readily producing digestive bodies when stimulated by the toxins.

THE WALLEY MEMORIAL FUND.

A MEETING of the committee and subscribers to the above fund was held in the Royal (Dick) Veterinary College, Clyde Street, Edinburgh, on Wednesday, October 6th, 1897, Principal Dewar, F.R.C.V.S., in the chair.

Owing to the lamented death of Mr. Finlay Dun, who had been acting as secretary and treasurer of the fund, it was necessary to elect others in his place. These were found in Mr. C. Cunningham, M.R.C.V.S., Slateford, near Edinburgh, who was appointed treasurer, and Mr. R. Rutherford, F.R.C.V.S., Bread Street, Edinburgh, hon. sec.

The CHAIRMAN announced that a sum of close upon £300 had been subscribed and paid into the fund, but that it was hoped the sum would still be very considerably increased. It is the resolve of the committee appointed to deal with the matter, that whatever sum be collected it shall be invested in the name of trustees on behalf of the subscribers, and that the annual interest accruing be applied in the giving of a money or other prize annually to the student who passes the best examination in the following subjects: Pathology, materia medica, and hygiene; such examination to be held in October each year, and to be open to the students of any British or Irish veterinary college who have passed the Royal College of Veterinary Surgeons' "C" examination under the four years' course, since the commencement of the previous winter session.

The feeling was also given expression to that if the sum collected is sufficiently over what will provide £10 a year as a prize, that the excess sum should be applied as providing a medallion of the late Professor Walley, and which would be placed in the Royal (Dick) Veterinary College.

The committee indulge in the hope that at least £500 will be subscribed, so that the prize may be well worth competing for, and be a fitting memorial to him whose name the prize will bear.

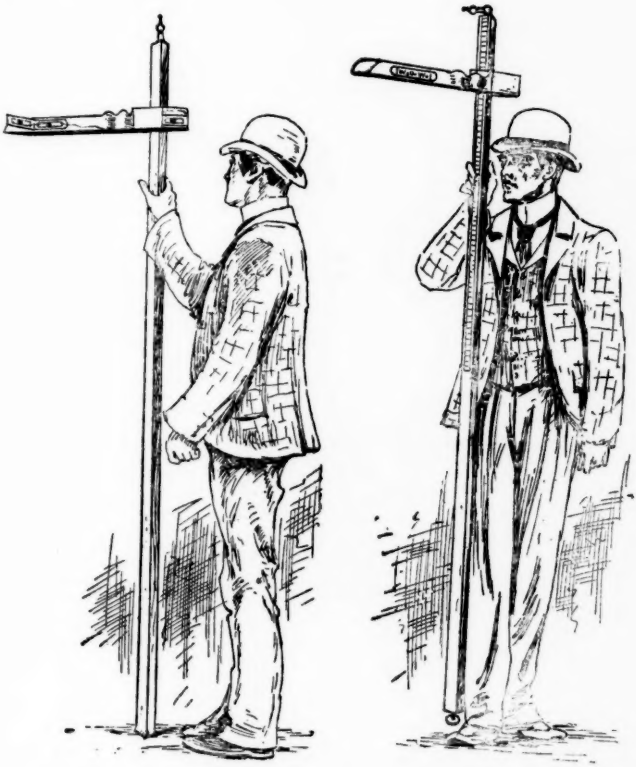
May I beg your assistance in again bringing the scheme before the profession.

Remittances should be addressed to the treasurer of the fund, C. Cunningham, Esq., M.R.C.V.S., Slateford, near Edinburgh.

R. RUTHERFORD, *Hon. Sec.*

A NEW PATENT STANDARD.

In all matters connected with the rather uncertain, not to say invidious processes whereby comparisons for competitive purposes are made, we are constantly reminded of Mrs. Malaprop's aphorism that "comparisons are odorous." With the best intentions, human nature tends to be partial, and by imperceptible proclivities one finds himself tending towards the mustering of facts to satisfy foregone conclusions.



The "horse trade" has hitherto not been the least open to the gentle impeachment of the desire to favour a friend.

In all cases where absolute correctness of height measurement is required for "show" purposes, it is well that this tender feature in human action be eliminated. For this purpose we are glad to see that an instrument meeting all the requirements has been recently patented by Professor W. O. Williams,

of the New Veterinary College, Edinburgh. Three fruitful sources of error, accidental or intentional, are made of no effect. These are the sloping of the measuring rod so that an inaccurate standard may be read, the means by which the ordinary measuring rod enables the user to *see* the record of his measure, and lastly, the possible variation introduced (unintentionally may we hope) by the rod being out of contact with the ground.

The sloping of the rod is prevented by the user and others being able to notice the positions of the bubbles in *two* levels placed at right angles to each other; the scale is so situated that while those standing near may see it, the measurer has no means of seeing it himself; and the slightest attempt to raise the rod from ground contact causes the drooping of a conspicuous index at the top.

All exhibitors of horses for competitive or show purposes are likely to avail themselves of this contrivance, and we are glad to see that it is made in a substantial and efficient manner by Mr. J. A. S. Nicolson, Optician, 17, Haddington Place, Edinburgh.

RABIES IN KENT.

A SERIOUS outbreak of rabies has occurred in Kent. Two or three days ago a mad dog appeared in the village of Hildenborough and ran loosely about the streets for some time. Before it could be shot it had attacked two men and a little girl, each of whom was bitten. When the body of the mad dog was subjected to a *post-mortem* examination, undoubted traces of rabies were found. Considering it desirable to have a further veterinary opinion, the police despatched the head of the animal to the Board of Agriculture, whose inspector, Mr. Townsend Wilson, confirmed Mr. Gregory's opinion. The local Infectious Diseases (Animals) Committee met yesterday morning to consider what steps should be taken in the matter, and an order was issued directing the police to at once destroy all suspected and stray dogs. They also recommended that the expenses connected with sending the two men and the girl bitten by the dog to Paris for treatment at the Pasteur Institute should be defrayed out of the county rates.—*The Veterinary Record*, October 23rd.

AN ADDRESS ON THE WORK OF PASTEUR AND THE MODERN CONCEPTION OF MEDICINE.

Delivered before the British Medical Association at Laval University, Montreal.

BY PROFESSOR CHARLES RICHET,

Delegate of the French Government and of the Faculty of Medicine of Paris to the Sixty-fifth Annual Meeting of the British Medical Association.

(*Continued from page* 286.)

The Microbic Theory of Disease.

A great step yet remained to be taken. This was to determine the evolution of these germs, not merely *in vitro*, but in the living organism. We to whom the idea of parasitism and microbe infection is now so familiar can scarcely conceive that it has not always been thus.

The microbic theory has become so ordinary, so popular, that we are tempted to believe that the part played by microbes was understood even in the times of Hippocrates, but I assure you that in truth this was not the case, and for long enough after Hippocrates the power of microbes was not known.

Pasteur, to whom, and to Sédillot and Littré, we owe the word "microbe,' was the first also to explain to us in his essay on the silkworm disease, published in 1867, the part they played in the production of disease. He proved that the bright corpuscles found in the bodies of diseased silkworms are living germs—a distinct living species, a parasite which can multiply and reproduce itself and disseminate the contagion.

It was therefore with painful astonishment that I heard Professor Marshall Ward recently say that the discovery of the part played by micro-organisms in disease was due to Koch, and dated from 1876. Now, ten years before this, Pasteur had published his experiments on *pébrine* and *flacherie*. Davaine had shown the part played by bacteria in anthrax infection, and the idea of infection and of contagion by microbes in the higher animals as well as in the lower had become a common place, not indeed in the medical world, but in all laboratories.

Thus, by successive steps, did the work of Pasteur develop in all its greatness and logic. In the first place, in order to elucidate a chemical problem, he studied tartaric fermentation, and he showed that they were biological phenomena with all its consequences, and was led to the conception that disease was due to the development of a parasite.

The normal living being follows out its course of growth without the development of any organic parasite in its tissues or in its humours. But if these humours or tissues happen to be inoculated with any organism capable of developing, then this small living thing multiplies, the higher organism is infected, and the whole body becomes, as it were, a culture fluid, in which the pathogenic microbe propagates itself, a centre of infection which scatters the disease by sowing the noxious germs wherever it goes. Thus arose the new conception, profoundly new not only for medicine but for hygiene—Disease is Parasitism. Thenceforth we understood the meaning of the words "infection" and "contagion," previously mysterious.

It is true that Pasteur did not discover all the microbes of all contagious diseases; but this is of small moment, since he was the first to discover that infection was a phenomenon of microbial parasitism. All those who after him have proved points of detail, however important or fundamental they may be, have but followed the path traced by the master. Whether they will or not, they are all the pupils of Pasteur, as those who follow the study of chemistry are the pupils of Lavoisier.

The greatest of Pasteur's disciples, Robert Koch, although with some ingratitude he refuses to recognise his master, has only perfected certain points in technique, and applied his ingenuity and his perspicacity to the solution of questions which, in spite of their practical importance, are still secondary. He has not, in fact, been able to do anything new except upon points of detail; all that is essential comes from Pasteur himself.

Need I say that this idea of the microbe of the parasite has become the basis of medicine. If we take up treatises on pathology written before this prodigious revolution, we shall be astonished by the insignificance and the nothingness of these very ancient books. Yet they are not really very old; they are dated 1875 or 1880; but as one reads them, it seems as though several centuries must have intervened between these venerable writings and modern books. I know an excellent article on tuberculosis written in 1878, before the microbe of tuberculosis had been discovered. Well, this article belongs to another age; it belongs no longer to

medicine, but to the history of medicine, for it swarms with mistakes and incredible errors with regard to pathological anatomy, etiology, prophylaxis, treatment—in fact, from every point of view.

In ten years medicine has been entirely overturned and re-made. It is being re-made every day. Every day brings some new discovery in matters of detail; but the great principle is always there, and it must always be attributed to the one initiator.

This is not all. Another new and great discovery was to be made by Pasteur himself, and to constitute the supreme development, the culminating point, as it were, of his life's work. This is the principle of vaccination. By a series of researches, admirable for their precision, Pasteur proved that the pathogenic microbe could be attenuated—that is to say, rendered incapable of causing death. But, though this microbe does not cause death, yet it can produce the disease, a disease sometimes so attenuated as to be almost imperceptible. Now, the living being which has suffered from this attenuated disease is protected against its more serious forms, and, borrowing the word consecrated by the immortal discovery of Jenner, Pasteur said that we have here "vaccination."

Fermentation, infection, contagion, vaccination; here in four words we have the work of Pasteur. What more need I say? Do not these four words possess, in their simplicity, unequalled eloquence?

Can anyone longer maintain that the progress of medicine is not due to experimental science? Does not all this knowledge of microbes, and of the part which they play in disease imply, immediately and necessarily, immense progress in therapeutics?

Antiseptic Surgery.

To take but one example, I will cite the application of microbial theories to surgery.

There was a time when erysipelas, purulent infection, and hospital gangrene decimated those upon whom operations had been performed, when puerperal infection claimed a terrible number of victims. It seems to us nowadays that the medical profession before 1868 were blindfolded, and that their blindness was almost criminal. These are now no more than historic memories. A sad history, doubtless, but one which we must look at coolly in order to understand what science can do for medicine. Left to their own resources, practitioners of medicine during long centuries could do nothing against erysipelas, against purulent infection, against puerperal infection; but, basing itself upon science, surgery has been able to triumph over these odious diseases, and to relegate them to the past.

Let me here introduce a reminiscence. When, on the occasion of his jubilee, a great celebration was prepared for Pasteur in the Sorbonne, in the presence of the leading men of science of the world, there was a moment when all hearts were softened, the moment when the great surgeon, who was first to perceive how to apply to the practice of his art the theory of pathogenic parasites, when Lord Lister drew near to Pasteur, and gave him a fraternal embrace. These two great benefactors of humanity, united in their common work, afforded a spectacle never to be forgotten, a striking reconciliation of medicine and science.

But the apogee of the glory of Pasteur was the discovery of the new treatment of hydrophobia. No one of his scientific conquests was more popular, and from France and from the whole world there arose a long cry of admiration. Perhaps, in the eyes of biologists, this discovery possesses less importance than his labours with reference to the fermentations and to vaccination, but for the public this was the chief part of Pasteur's work. And men of science also were forced to admire the scientific courage of Pasteur, who, putting aside the precise methods which he had taught and

discovered, knew how to devise new methods to meet the exigencies of the circumstances, and how to put them victoriously into practice.

Thus was finished the work of Pasteur. He was spared to take part in the triumph of his ideas, and to be a witness of his own glory. If, like so many creators, he had sometimes in his earlier days known conflicts and hatreds and petty quarrels and foolish objections, nevertheless he had not to deplore the ingratitude of mankind. He died full of honours, surrounded by admiration, respect, and love. For him posterity had already commenced when he died.

The Union of Medicine and Science.

And now let us turn back to consider the indisputable union of medicine and of science. This, in fact, is what ought to strike us in the work of Pasteur. It is not only in general biology and in the progress of our knowledge that his work is great: it is still more in its immediate practical applications. The great biologists of our century—Lavoisier, Claude Bernard, Darwin—have, without doubt, left behind them work which, by reason of its conquest of new truths, is not inferior to the work of Pasteur, but these new truths do not lead to any such immediate application as antiseptics, the treatment of hydrophobia, anthrax vaccination, or the prophylaxis of infectious diseases. Pasteur was not only a man of science: he was also a philanthropist, and there is scarcely one who can be compared with him as a benefactor of suffering humanity, except Jenner, who found out how to preserve thousands and thousands of human beings from the most hideous of all diseases.

Further, Pasteur brought back medicine into the true way of science. Even after Magendie, Müller, Schwann, and Claude Bernard, it might still have been asked whether all these experiments establishing so many important truths had really been of any advantage for the relief of the sick. To discover, as did Schwann, that living beings are an aggregate of cells; to prove, as did Claude Bernard, that the liver forms sugar; to establish, as did Darwin, that living species can be transformed by the influence of long-accumulated variations in the environment—these are admirable pieces of work, but work in pure science which had not any immediately therapeutic results. Strictly speaking, then, it was possible to maintain that clinical medicine did not derive any benefit from such investigations. I do not for a moment believe that this opinion had a shadow of foundation, but before the time of Pasteur it was not so absurd as it has become since Pasteur. Since Pasteur no man can, without incurring the charge of monstrous ineptitude, refuse the rights of citizenship in medicine to experiment and to biology.

And to speak the truth, men of science and biologists, as though their ardour had been redoubled by the renovation of medical ideas, having during these last ten years made discoveries which have introduced into medical science new elements which clinical observation alone had been absolutely incapable of discovering. I will cite a few examples: the action of the thyroid gland, the Roentgen rays, pancreatic diabetes, and serum therapeutics.

Thyroid in Therapeutics.

Physiologists had shown long ago that the ablation of the thyroid gland led to serious results. Schiff had proved this as long ago as 1857, but the explanation of the phenomenon did not become clear until Claude Bernard, but especially Brown-Séquard, had demonstrated the existence of internal secretions of glands pouring into the blood their products which probably neutralise certain toxic substances. This very naturally led Vassale and Gley to inject into animals, from whom the thyroid gland had been removed, the juice of

the thyroid, and thus prolong their lives. The therapeutic conclusion to be drawn was obvious, namely, to treat the unfortunate subjects of cretinism, or of diseases of the thyroid gland by injection of extracts of the thyroid body. You know that the result has been most happy.

This new treatment was a true experiment, and as is the case with so many experiments, the actual result has been a little different from that which was expected. The ingestion of thyroïdin is not only a means of curing goître and cretinism, but is only a treatment, sometimes remarkably efficacious, for obesity.

The Röentgen Rays.

The discovery of the Röentgen rays excited general enthusiasm, and, as a matter of fact, it is one of the greatest conquests of contemporary physics. Most assuredly, medicine had nothing to do with it. The research was made and the success was obtained in a physical laboratory. Now, you are not unaware that these Röentgen rays have been called to play a part, if not in the treatment, at least in the diagnosis of diseases—a part, the importance of which goes on increasing from day to day. Physicists have discovered the principle; it is for medical men to follow up its application.

Pancreatic Diabetes.

The existence of pancreatic diabetes was suspected vaguely by a clinical physician, Lancereaux; but the means which clinical medicine and pathological anatomy placed at his disposal, did not give him the power to solve the problem. In spite of his perspicacity, he could do no more than note a certain correspondence between diabetes and lesions of the pancreas. How could more have been learnt if we had not the resource of experiment? Two physiologists, Mering and Minkowski, have had the good fortune to show that ablation of the pancreas determines glycosuria, to show that there is a pancreatic diabetes, and they have studied its various conditions with great ability.

Serum Therapeutics.

I come now to serum therapeutics, a direct consequence of the labours of Pasteur. This is a mode of treatment born of the experimental method alone. Here, again, science has done for the art of medicine that which clinical observation, left to its own resources, could never have accomplished.

Permit me now to show how serum therapeutics is derived directly from physiology and experiment, and pardon me if I am forced to speak of my own work; I shall do so, I hope, without any vanity. I know very well that we always owe to our predecessors and to our rivals much more than our pride admits, and that the experiments and the ideas which succeed are not always those which have been conceived most methodically.

About 1887 M. Chauveau had shown that French sheep could contract anthrax, and that they are very easily infected by the bacillus anthracis, the microbe of anthrax, if small quantities of the bacillus be injected under the skin. But Algerian sheep seem to be safe from the disease. In vain is the bacillus anthracis injected into them; they do not contract anthrax. They are refractory to this disease and possess a remarkable immunity to it. Having reflected on this strange fact, I framed the hypothesis that the cause of the immunity of the Algerian sheep, which are absolutely similar from the anatomical and zoological point of view to French sheep, depended upon chemical substances contained in the blood, and that in consequence we

might hope to confer immunity on French sheep by transfusing into them the blood of the Algerian sheep. It is, however, difficult to make experiments on sheep. Therefore, with my friend, Héricourt, who has been throughout these researches my tireless fellow-worker, I took animals of two different species, the common victims of physiologists—rabbits and dogs.

Just at that time we had been studying a microbe nearly related to the staphylococcus albus, the staphylococcus pyosepticus, which in rabbits produces enormous subcutaneous swellings when injected under the skin, and causes death in twenty-four to thirty-six hours. The dog, on the other hand, seems to be almost refractory to inoculation with this microbe. We therefore attempted to transfuse the blood of the normal dog into rabbits by intravenous injection, but this operation did not succeed, for the transfusion of dog's blood into the veins of the rabbit, even in a dose of only 10 g., rapidly causes death.

It then occurred to us to resort to peritoneal transfusion in place of intravenous transfusion. In this way we were able to introduce into the organism of the rabbit 50 or 60 g. of dog's blood, and had the good fortune to see the experiment succeed completely. Rabbits transfused with the blood of the normal dog survived the inoculation of the microbe for four or five days, and rabbits transfused with the blood of a dog vaccinated against the microbe did not die, and were, in fact, hardly ill at all.

This experiment, which was made on November 5th, 1888, is, as it seems to me, the very basis of serum therapeutics ; it, in fact, proves that the blood of animals refractory to a disease contains chemical bodies which counteract the effects of the specific pathogenic microbe of the disease. We understood its importance from the first, and having established the general pathological principle, we resolved to apply it to the disease of man.

For several days, then, Héricourt and I debated the question whether we should experiment with one or other of the three diseases—anthrax, diphtheria, or tuberculosis. Unfortunately we decided for tuberculosis. Its microbe is easily cultivated, and, as you know, it produces greater ravages among men and animals than any other disease. We set to work at once, but, as you will understand, time was required before we could obtain definite results. Still, in a year's time we were able to show that the injection of dog's blood into rabbits retarded enormously the development of tuberculosis. It was, nevertheless, necessary to pass from experimental physiology to human therapeutics. Taking advantage of an observation of Bouchard's to the effect that the serum of refractory animals is as active as the whole blood, we were able to inject the serum in tuberculous diseases. The first sero-therapeutic injection was made by us on December 6th, 1889.

At first we had for a space great hope. Yes, in truth, for several weeks we believed that we had discovered the heroic treatment of tuberculosis. For several weeks the various patients that we had under treatment found that their strength was renewed, that their appetite returned, that their weight increased, and that cough and expectoration disappeared almost completely. But, alas, it was no more than a transient improvement. A month or a month and a half later the pitiless disease resumed its course, and the serum-therapeutic treatment turned out to be inefficacious. Happily, while by the most diverse plans we were in vain searching for a method of treating tuberculosis by serum, a German experimenter, Behring, after studying the effects of the serum of refractory animals upon diphtheria, showed (in 1892) that this serum is wonderfully efficacious in the treatment of the disease. He applies the serum method of treatment not only to diphtheria, but also to tetanus, and, at first in animals and afterwards in man, he obtained results which were really marvellous. Gentlemen, you know the rest, and I

need not tell you that this sero-therapeutic method, improved and popularised by Roux in 1894, is now a treatment without compare. The statistics on this head are absolutely conclusive. The mortality of diphtheria, which was 45 per cent., has fallen to 15 per cent. That means for the city of Paris alone an annual saving of about 1,000 human lives ; for the whole of France, nearly 10,000 lives. We may take the same proportion for Italy, Germany, England, the United States, Canada, and Russia, and may estimate the number of infants which serum therapeutics snatch from death at about 50,000.

In other diseases the results of serum therapeutics have been more open to criticism, and it would be necessary, in order to arrive at a satisfactory conclusion, to discuss them in detail. I cannot attempt to do this here, for it would be an abuse of your patience. I will content myself by venturing the opinion that serumtherapy has not said its last word. The organism is endowed with a marvellous power of resisting the poisons secreted by microbes. It sets to work in its turn to secrete counter poisons which neutralise the poisons secreted by the microbe. The antitoxins of the organism combat the toxins of the parasite, and in the future the art of serum therapeutics will be to seek in these resisting organisms the antitoxins fabricated by their cells.

Medicine and Experimental Science.

Thus on whatever side we turn we find that medicine has always been guided by experimental science. By experiment and by science it is compelled to march forward. This was true in the time of Harvey, for that immortal physiologist had to meet the opposition of physicians. This was true also in the time of Lavoisier, when by a few decisive experiments he proved the chemical nature of the phenomena of life. But how much more true is it at the present time, since Pasteur has by experiment laid open a whole world, and has warranted us in conceiving the widest hopes for the future of medicine ?

The parts of the man of science and of the physician are very different. The physician ought to be conservative, applying methodically the teaching and the precepts which he has received. He has no right to experiment upon his patients, or to permit human life or human suffering to be risked on fantastic theories. But the man of science ought to be a revolutionist. He ought not to be content with the doctrines which he has been taught. The opinion of the master ought to be but a light weight upon his mind. He ought to seek on every hand for facts which are new and even improbable. Darwin says somewhere that he made the experiments of a fool, and often it is right to attempt that which appears contradictory to all the most received and classical opinions. Without this spirit of adventure, without this scientific daring which opens up new horizons, there is no progress.

The task of the explorer or of the pioneer is not that of the physician, He ought to be careful to keep himself abreast of all scientific progress in order that his patients may have the benefit of it, but he cannot advance the progress of science, save within restricted limits. Having no right to experiment, he is almost powerless to solve the difficult problems which arise.

It is the duty of the chemists, the physicists, and, above all, the physiologists, to guide medicine into the new ways. They have not to take the heavy responsibility of a human life upon their shoulders, and nothing ought to check their audacity. You, gentlemen, have not the right thus to be audacious : you need prudence and moderation, and, convinced as I am of the power of experimental science, I still think that the applications which the chemists and the physiologists suggest to you should only be accepted with considerable caution. It costs us nothing, after a few experiments which

have succeeded fairly well, to say to the physician, "Try that on your patients." You know very well that our responsibility is *nil*, and that the ancient axiom, *primo non nocere*, an axiom which ought to be your strict rule of conduct, does not in any way apply to us. You see, therefore, that it would be unjust to make it a matter of reproach to physicians and surgeons that they have not made great scientific discoveries. This is not their mission. It is theirs to relieve human suffering, and to seek among new scientific truths that one which is most proper to relieve or to cure the sick.

Nor can I understand how anyone should have wished to create an antagonism between medicine and science. To suppose that they are in contradiction is to show that we understand nothing about either the one or the other. It is not reasonable to assert that the one is superior or inferior to the other; they are different in their means and in their ends. They are mutually complementary, and both are equally necessary.

If I were ill most assuredly I would not seek the assistance of a chemist, or of a physiologist, and medicine is not to be learned from the books of Claude Bernard or of Pasteur. Clinical instruction is necessary, such as long observation of patients alone can furnish. Prophylaxis, diagnosis, prognosis, therapeutics are not to be learned in scientific books. Something else is necessary—observation, long, patient observation, the old Hippocratic observation, without which there can be no good physician. Young students must be guided in the examination of patients by experienced practitioners, and no one, I presume, would be guilty of the folly of proposing to replace the clinical ward by the laboratory.

But without laboratories the clinical department must remain incapable of scientific advance, and this condition of stasis is assuredly undesirable, for, in spite of all the progress which has been made, much yet remains to be done. Are not tuberculosis and cancer, for example, the disgrace of medicine? I appeal to all medical men here present. Is there any one of you, gentlemen, who, in the presence of such painful modes of death, does not feel himself humiliated to the bottom of his soul by his powerlessness?

Well, this feeling of our present powerlessness against disease ought to stimulate us to work. The work to be done is enormous, and we must none of us grow weary of our task. We physiologists must seek new facts, we must seek and seek again, seek always without being afraid of the boldest hypothesis, and without putting any limit to our audacity, without troubling our heads as to the practical consequences which may flow from our discoveries, having only truth—divine truth—for our object. As for you, gentlemen, it is your duty to follow with the warmest interest both the general effect and the detailed results of biological discoveries in order to attempt to find some practical application for them. From this unceasing collaboration progress will be born. But it is necessary that men of science and physicians should both be animated with these two governing sentiments—faith in science and love of man.

Review.

THE PRINCIPLES AND PRACTICE OF VETERINARY MEDICINE. By W. WILLIAMS, F.R.S.E., F.R.C.V.S., etc. Eighth edition. pp. 863.

From the fact that "The Principles and Practice of Veterinary Medicine," by Professor Williams, has now reached its eighth edition, the penultimat e

having only been before the public for the short period of four years, it may be taken for granted that not only are the advancements in veterinary science progressing with rapid strides, but also that men are to be found able and willing to give their energies to the work of recording this progress. In so far as thorough practical experience is combined with the scientific spirit of the age (which takes nothing for granted), we think this book has been remarkably fortunate in finding so appropriate an author. Principal Williams has not only given the profession his former ideas in new habilaments, but he has written what is virtually a new book, in so far as the record of recent progress is concerned. We all know, of course, how small indeed may be the space into which the essentially new matter of any scientific treatise may be compressed. On the other hand, on a subject so practical as that of medicine, and depending so largely on the records of past experience, a condensed treatise, devoid of all but the few more immediate advances, would be of but small value to the busy practitioner or the anxious student. To become practical at all a science must record its past as well as reach towards the future. We would not have it understood that Principal Williams' new treatise embodies a history of his profession, but we are bound to state that he has managed to preserve among the new promising theories of our art-science just that amount of well-established practice without which no book intended as a guide, alike to practitioner and student, could be deemed complete.

In the space at our command, it would be impossible to draw attention to more than a few of the points of merit in this medical treatise. To begin with, the reader will observe that apparently impelled by the growing demand for scientific picture books, our author has not spared the labours of his illustrators; from the student's point of view, in particular, this is the more fortunate. There are 13 plates and 50 wood-engravings and photo-micrographs, the majority of which are in connection with contagious diseases, while many, indeed, represent truly original work of a kind, we feel safe in saying, usually conspicuous by its absence in works of this kind.

We find the chapter on "Contagion and Contagious Diseases" is almost entirely re-written; while on anthrax and swine fever, in particular, much new matter has been added. We are also glad to note that considerable attention has been directed to preventive medicine in connection with the above subjects, in particular, the work of Billings, Cornil, Chanternesse, etc., in this direction has been incorporated.

Of course, tuberculosis has received its full share of attention. A new chapter on septic diseases has apparently been added.

Most of our readers who are no doubt aware of Principal WILLIAMS' Commission last year, by the Government of Jamacia, to investigate a virulent outbreak of disease among the cattle in that island, will be glad to notice an intelligent description of results in that enquiry, in Chapter xxxvi, this being accompanied by illustrative photo-micrographs.

As an illustration of the marked change which photographs have made in the illustration of medical works, we may point to the figures just mentioned as well as to those illustrative of what our author has made a subject peculiarly his own—Louping-ill. We all know how little works like that to which we draw attention depend on criticism, of whatever nature it may happen to be. Unlike literary productions, they are written for a definite purpose, and will be purchased and read by those who find need for them, irrespective of any attempt "to cry them up or down."

From the last fact, that the eighth edition has pressed so hardly on the heels of the seventh, we feel certain that satisfactory as this edition, no doubt, is, Principal Williams' pen will not be allowed to "dry up" for any protracted period; his present work is but an earnest of what is sure to follow.

Extracts from Foreign Journals.

NOTES ON BOVINE PATHOLOGY.

By M. Flahault, Veterinary Surgeon at Poitiers.

An Uncommon Nervous Affection.

My first case is that of a cow about eight years old, impregnated for the first time a month before, habitually in good health. She appeared simply fatigued and not ill. If a little hay was offered her it was seized with avidity, but when it reached the first molars the mouth was opened quite wide, while at the same time the head was sharply and quickly thrown to the left, the muzzle almost touching the backbone. The hay fell down and the head resumed its normal position. This abnormal movement was repeated each time the animal took food, which consisted of hay or finely-chopped beets. Ingestion of four litres of water slightly mixed with barley meal took place in normal fashion. A thorough exploration of the mouth, made with much patience, enabled me to determine the sensitive part. It was situated on the right, two or three centimetres within the egde of the lips, facing their commissure; in size it was almost as big as a two-franc piece. When the attempt to explore the place was first made, the movement described above was so sharp that the assistant holding her head was obliged to let her go, and the animal fell to the ground. I tried to modify the sensibility by cauterising the spot with a pencil of nitrate of silver. The next day I showed the patient to a doctor, who compared the spot to the hysterogenic zones of the human species, and advised elongation of the nerves. I contented myself with painting with tincture of iodine; for food I prescribed farinaceous drinks and boiled vegetables. Eight days later the cure was complete and definite. Eight months after, parturition took place normally.

NERVOUS TROUBLES APPARENTLY DUE TO A CALCIFICATION OF THE FINEAL GLAND.

Second case:—A cow, six years old, in calf for six months, and kept permanently in a byre. General uneasiness for some days, with difficulty in raising herself. Complete want of appetite, eyes bloodshot, with pupils dilated, but sight and hearing quite sound. The principal feature was extraordinary hyperæsthesia of the whole skin. Examination with the hand seemed to give great pain. The cow was slaughtered. All the organs appeared sound. On examining the nervous system I found a section of the bulb, a hard substance, grating against the bistoury. It was the fineal gland, big as a harricot, elongated from right to left and strongly infiltrated with cholesterine, especially on the right. The choroid plexuses appeared healthy, except for a little congestion in that on the right side, probably owing to the compression exercised by the fineal gland. Cuts made perpendicularly to the bulb discovered on the right a hæmorrhage appearing to proceed from one of the divisions of the Gallien vein. The infiltrations extended between the

lateral ventricle and the bed of the vein. The diseased part was of conical form, and about as big as an almond.

NOTE ON CALF-FEVER.

Third case: A cow, seven years old, delivered, on the night of 28th to 29th December, 1895; slight colics on the 30th, about two hours after mid-day. At seven in the evening the cow rose up suddenly, walked straight forward until she knocked against the wall of the stable, against which she pushed for about ten minutes, when she fell down again. I found her at ten in the evening lying with her forehead resting against the wall, and her nose turned towards her chest. I had her removed, and proposed as treatment: bleeding, ice on the skull, warm coverings on the body, warm cresylated injections and into the uterus. I diagnosed, comparing the symptoms with those described by Mr. Nocard—presence of sugar in the urine. A testing dose seemed to show 60 grammes of sugar to a litre of urine. Bleeding in the mammary vein appearing the easier plan, the cow was kept on her side; she defended herself, got up quickly, and then fell head-foremost. No improvement; towards midnight there was a fresh crisis, grinding of the teeth, rolling of the eyes, stertorous breathing, head thrown back; the cow got up again, crossed the stable tottering, supported herself with her head against a plank partition which she made to give way, and fell with the planks. From this moment, general contractions, sweatings; death at half-past twelve. On autopsy, no lesions were visible to the naked eye.—*Recueil de Médicine Vétérinaire.*

SERUM-TREATMENT OF TETANUS IN THE HORSE.

At the sittings held on the 20th and 27th July, M. Nocard made two new communications to the Paris Academy of Medicine on the subject of serum-treatment of tetanus in the horse. From the experimental as well as from the clinical point of view, the results obtained by our colleagues confirm those which he made public in 1895, namely, that the antitoxic serum employed as a preventive of tetanus in the horse had wonderful success, but when applied to the treatment of declared tetanus this serum was almost always a failure. However, in presence of new information collected from practitioners who have treated tetanus with serum-treatment, M. Nocard considers this mode of treatment still the best, for, if it does not increase the number of cures, it shortens the course of the malady and diminishes danger of the crises. The serum would be especially useful in cases originating from an unknown cause, in which, it not being possible to eradicate the seat of infection, the poisoning would go on getting worse if the toxines were not destroyed at the same rate as that of their formation and before they fixed on the nervous system. But if serum-treatment still remains often inefficacious from the therapeutic point of view, it gives on the contrary remarkable results from the preventive point of view. In 2707 animals which had recently received two injections each of serum, most of them a day after termination, the rest two or four days later, not a single case of tetanus was observed in districts where the malady had made victims some days or weeks before. On the other hand, during the

time that the above-mentioned experiment lasted, M. Nocard's correspondents observed 259 cases of tetanus in their districts in animals not treated preventively. A single animal, which received the serum five days after traumatism, showed tetanic symptoms, but in a mild form. M. Nocard accordingly recommends the preventive serum-treatment of tetanns in regions where this malady is observed, and particularly after operations which most predispose to it. He terminates his last communication by repeating, with M, Warnesson of Versailles, that "employed preventively, the efficacy of the antitetanic serum is absolute."

RUPTURE OF A HORSE'S STOMACH.

The extent of the total rupture of the walls of the viscera was twenty-five centimètres along the great curvature; it was obliterated by a plug of dry and hard bran on which were resting the edges of the wound, swollen and already discoloured. This plug, which seemed to cause hernia of the stomach, was kept in place by the great epiploon, the thickened meshes of which had prevented food from falling into the peritoneal cavity properly so called; the other abdominal viscera were sound, and the peritoneum seemed to show only recent injuries. The patient showed the first signs of colic on the 11th February, without any grave symptoms. As it refused food and drink, it had administered to it on several different occasions different purgatives which were not followed by any expulsion of excrements. But eserine injected sub-cutaneously caused the discharge of hard and hairy fæces. The only particular symptoms were the jaundice-colour of the conjunctiva, the small and hard pulse, and the total want of appetite. The horse was put under milk-diet up to the 6th March following. At that time it seemed in a fair way towards convalescence, when someone gave it, all at once, a dozen litres of a mixture of milk and hay tea, and an hour after the animal was seized with colic, accompanied this time by pathognomonic symptoms of a stomachic lesion, and the animal succumbed. It had thus remained alive for almost a month with a lesion of such an extent.—*Bulletin de la Société Centrale de Médecine Vétérinaire.*

TREATMENT OF ARTICULAR WOUNDS BY MEANS OF THE PUS OF STRANGLES.

At the Central Veterinary Medical Society M. Cagny reported a work by M. Friez, veterinary surgeon at Petit Croix, near Belfort. To tell the truth, the very title of his work caused us not a little surprise. Indeed, up to the present time articular wounds have always been considered excessively serious in our domestic animals, because of two points of treatment which are difficult to meet from the absolute point of view, the antisepsia and the immobility of the articulation. M. Friez has changed the mode of treatment. The articular wounds being infected, he does not try to destroy the germs by means of antiseptic agents; he introduces, on the contrary, a germ of another kind (the streptococcus of Schütz), by making an inoculation of stranglous pus. The result of a treatment apparently so illogical is to bring about certain cure in a

short time. M. Friez notes down six of his most interesting observations of articular wounds, whether of the fetlock or the hock, all followed by cure after inoculations into the wound itself of stranglous pus. The two first observations relate to two young horses which accidentally got the articulation of the posterior fetlock opened up. These animals having strangles the appearance of several stranglous abscesses, very hot and painful, in the wounded limb, seemed to hasten the cicatrization of the articular wound. The third and fourth observations concern patients eight years old, which received articular wounds in the hock. In two cases, after two or three days, M. Friez introduced into the wounds a plug of wadding soaked with mucous from the nose, and stranglous pus. Eight days after, there was sensible improvement (rosy budding of the wound and ejection of a creamy pus, like that of strangles). At the end of fifteen days the fistulæ were completely closed. Following on these inoculations, stranglous abscesses developed in different regions of the wounded limbs. They were punctured and the cavity washed with solutions of lysol or salol. Finally, in the last two cases, two horses, twelve years old, had been treated for articular wounds of the fetlock joint about five weeks before. The patients were regarded as incurable, and M. Friez, when summoned for consultation, made inoculation with stranglous pus. In three weeks he obtained healing of the articular wounds. Stranglous abscesses developed in the injured limbs, but they offered little resistance to rational treatment (tapping and antiseptic washings). These facts are very interesting. They can only be accounted for by an antagonism between certain microbes (in these cases between the streptococcus of strangles and the pyogenic microbes). This antagonism, as M. Cagny remarks, has been already scientifically demonstrated between bacterian anthrax on the one hand, the streptococcus of erysipelas, and the pyocyanic bacillus on the other hand. As for the immobility of the articulation, it was consecutive on the swelling of the region after the inoculation of stranglous pus. This method of treating articular wounds is certainly strange and somewhat empiric. M. Lignières very judiciously remarks that if the streptococcus of strangles inoculated into an articular wound is favourable to a cure, it is none the less true that the pus from stranglous abscesses contains, in addition, other microbes, about neither whose number nor species nor degree of virulence we can judge without the microscope. It appears to him much more reasonable to use pure cultures of Schütz's streptococcus, or simply the injections of his toxine. (*Ibid.*)

Communications, Books, Journals, etc., Received.

The Lancet; Land and Water; Veterinarian; Veterinary Record; American Veterinary Review; Journal of Comparative Medicine; Australian Farm and Home; Results of Use of Tuberculin, by James Wilson, M.A.; Bacteriological Diagnosis, by St. John Reid; Country Life Illustrated; Recueil de Médecine Vétérinaire (Alfort); La Presse Vétérinaire (Paris); L'Echo Vétérinaire (Liége); Annales de Médecine Vétérinaire (Brussels); Berliner Thierärztliche Wochenschrift (Berlin); La Clinica Veterinaria (Milan); Il Nuovo Ercolani (Pisa); La Revista Veterinaria (Buenos Aires); Deutsche Thierärztliche Wochenschrift (Hannover und Karlsruhe); Archivos de Medicina (Lisbon: José Bastos).